JULY 2, 1960

Chemical Week

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WHETHER HE ATTACKS metal jar lids and bottle caps from inside or out, this corrosive imp is a threat to foods and beverages . . .

But now Shell Chemical's Epon® resin-based coatings form an imp-proof armor that tames corrosive attacks for keeps. Used as a coating, only one-fifth as thick as the cellophane on your cigarette pack, an Epon primer is impervious to corrosion vapors—even to pickling solutions of salt and vinegar. And on bottle caps, despite heavy pressures used to crimp and seal, Epon resin coatings remain uncracked, unchipped, and uninvaded.

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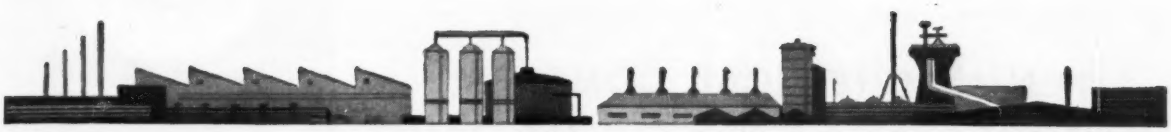

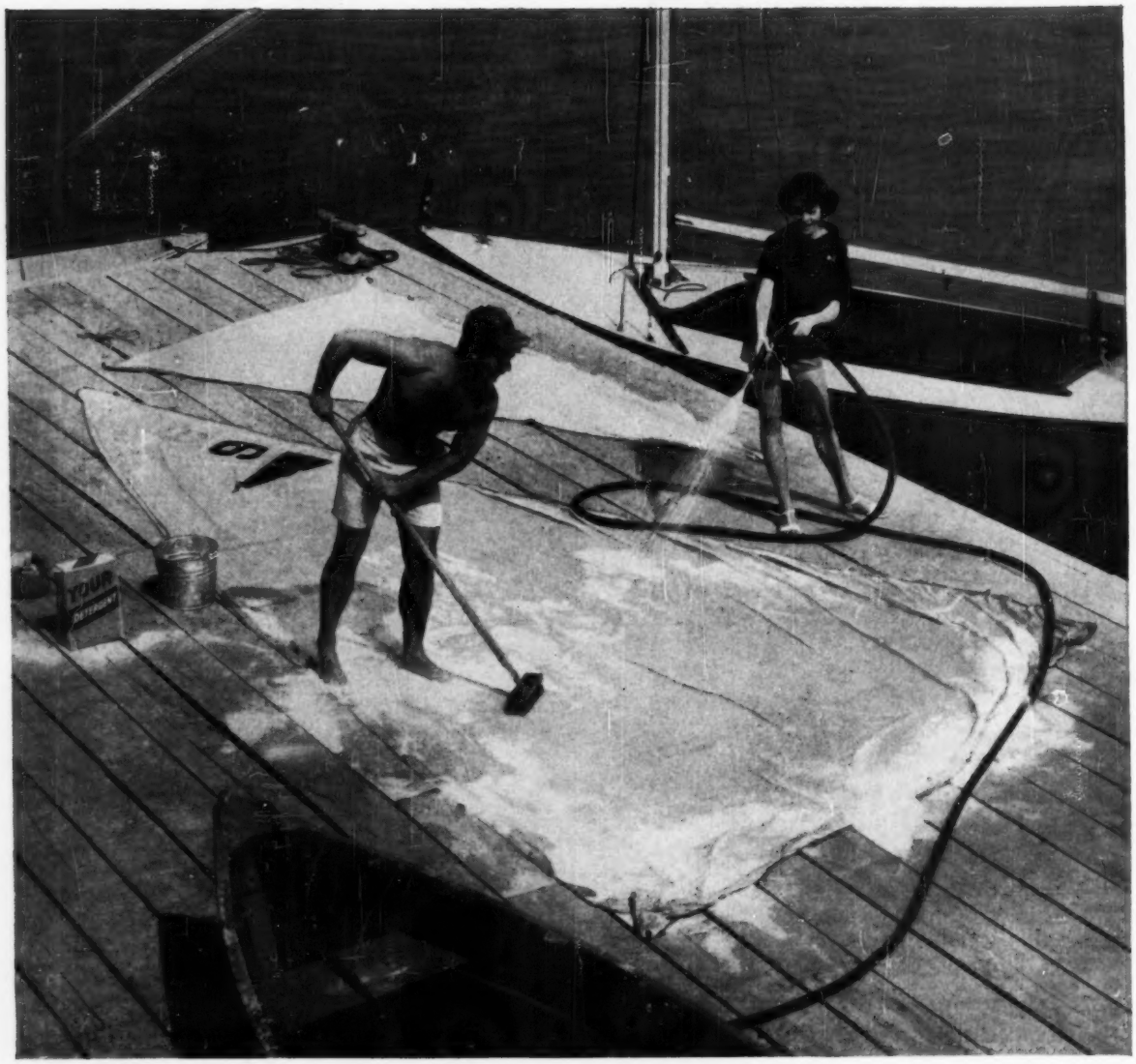

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ON THE COVER: Three bursts of fireworks are combined on this single time-exposure by photographer Mike O'Connell.

Chemical Week

Vol. 87, No. 1 JULY 2, 1960

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE, EDITORIAL, CIRCULATION AND ADVERTISING OFFICES: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Place of publication: 3rd and Hunting Park Ave., Philadelphia 40, Pa. Second class postage paid at Philadelphia. (See below for directions regarding subscriptions or change of address.) OFFICERS OF THE PUBLICATIONS DIVISION: Nelson L. Bond, president; Shelton Fisher, Wallace F. Traendly, senior vice-presidents; John R. Callaham, vice-president and editorial director; Joseph H. Allen, vice-president and director of advertising sales; A. R. Venezian, vice-president and circulation coordinator. OFFICERS OF THE CORPORATION: Donald C. McGraw, president; Joseph A. Gerardi, Hugh J. Kelly, Harry L. Waddell, executive vice-presidents; L. Keith Goodrich, vice-president and treasurer; John J. Cooke, secretary.

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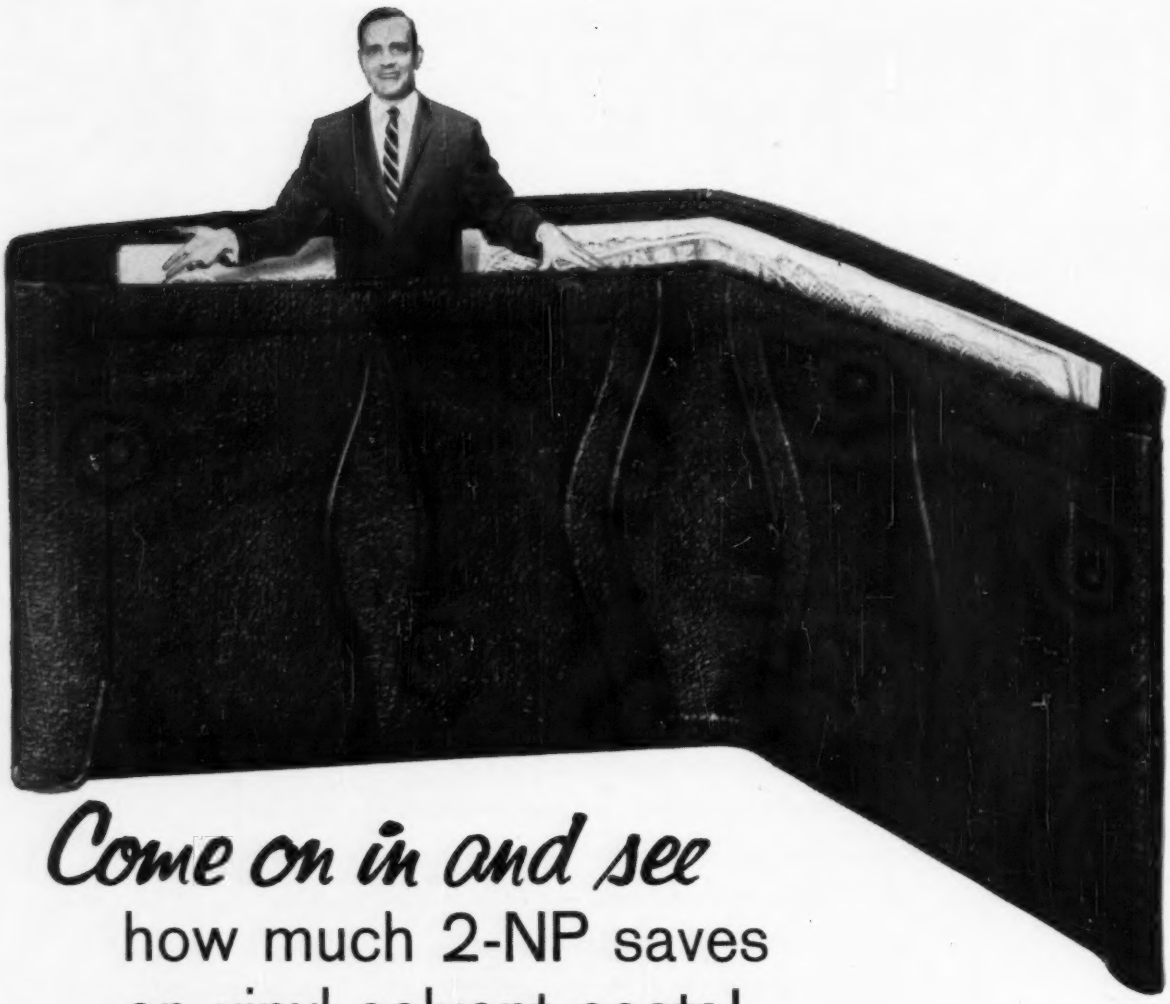

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VIEWPOINT

Two Views on Red Trade

SHOULD WE SELL TECHNOLOGY TO RUSSIA? Two industry men addressed themselves to that question in recent talks, and gave completely different answers.

Robert B. Fiske, recently with the North Atlantic Treaty Organization and before that with American Cyanamid Co., sided with the Manufacturing Chemists' Assn.:

"Premier Khrushchev has suggested that the United States sell some of its chemical technology to the Soviet Union, and this the U.S. chemical industry has declined to do. Not only are problems of the security of the United States and other nations bound up with that chemical technology. So also are problems of competition in world markets with a system dedicated to the destruction of our institutions . . .

"Although it has been admitted that the Soviet can develop this chemical technology by itself in time, it is urged by U.S. producers that we do not barter away the time advantage . . ."

The other side is taken by Tino Perutz, president of Omni Products Corp., a New York firm that has sold plastics machinery to the U.S.S.R., and also chairman of the International Committee of the Society of the Plastics Industry. He says:

"I continue to believe that trade—all trade between all nations—is a harbinger of peace . . .

"Our own existing export controls on strategic materials seem to have presented no insurmountable hindrance to the growth of Soviet military strength . . . At whatever cost and privation this program was achieved, . . . the Soviets accomplished their goals in spite of the fact that the United States did not supply the materials essential to the program . . .

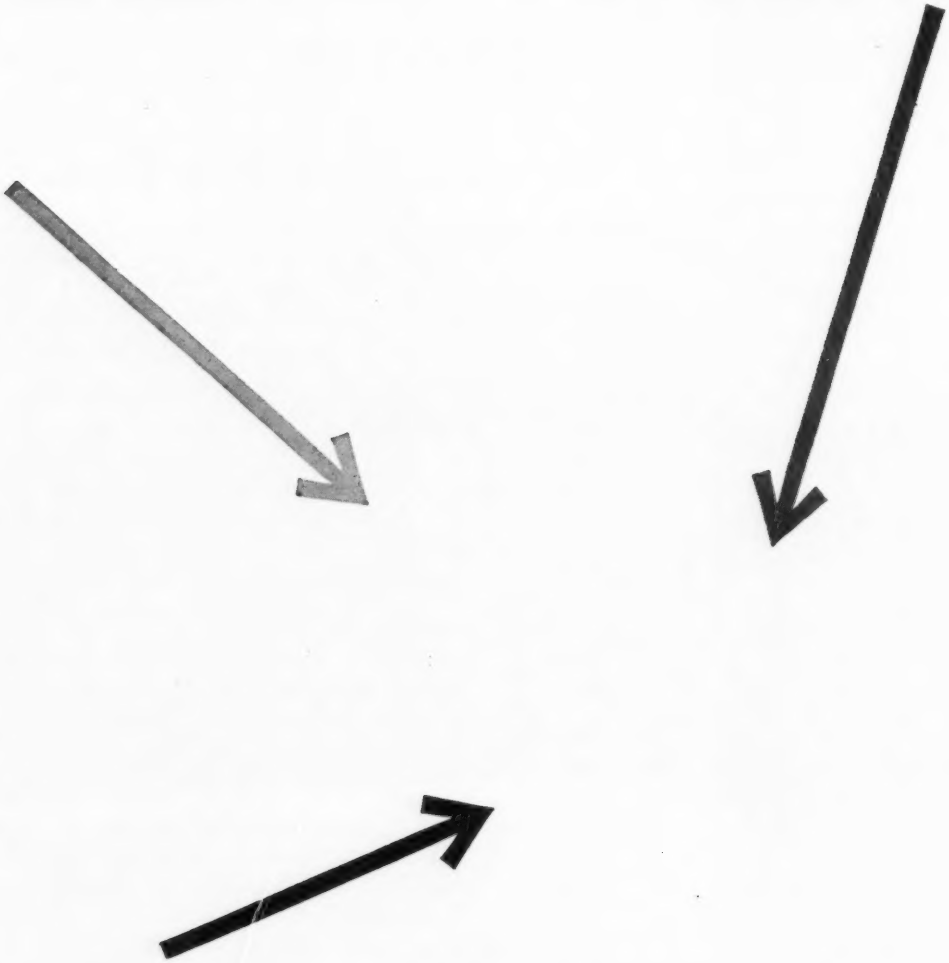
"During World War II, 70,000 towns and cities in Russia were destroyed, with 12 million casualties. To a people who have suffered such losses so recently, we might with a clear conscience lend assistance in achieving their economic goals. Why, then, should we not cooperate by supplying the tools for the program so that the Soviets cannot make us the scapegoats for any failure to fulfill their plan? If more normal trade relations existed, the Soviets would have to look for scapegoats within their own ranks.

"A Presidential study group made the point last year that by assisting the Soviets to improve their living standards we might contribute to an era of good feeling . . .

"For our part, we convey the impression that what little trade we do, we do half-heartedly, almost reluctantly . . . Perhaps the time has come to re-evaluate our general approach and to tackle the problems with maturity and realism, neither impairing our own dignity nor that of our trade partners . . .

"Our authorities have refused to license exports of certain plastic materials—products of the petrochemical industry—whereas West Germany and England have contracted to build plants that will manufacture those very materials in the Soviet Union."

There are good arguments on both sides, but this much is clear: U.S. policy doesn't jibe with that of our allies, who certainly have as much to fear from Soviet aggression as we do. The non-Communist world should speak to Russia with one voice; and if we can't persuade England, Canada, West Germany, Japan and other Western nations to accept our rigid policy, we should negotiate a compromise to which all can assent.



How to know a good thing when you can't see it

Process gases, unlike many other raw materials and intermediates, can't often be seen. But you can always tell where they are used by the way things happen . . . for more and more of these gases are being considered as basic utilities for new or improved chemical processes.

The chemical industry today takes advantage of a wide array of gases produced or purified by low temperature techniques. These include oxygen, nitrogen, argon, synthesis gas, ethylene, methane, HCl, CO . . . and most recently, liquid hydrogen and liquid helium. Air Products is supplying many of them in tonnage quantities to process plants of many types across the nation . . . delivers gaseous or liquefied forms to each customer in the way that suits him best—from a generating plant right at the point of use, or hauled in from a central plant.

Exciting new prospects loom for the chemical industry through continuing developments by Air Products researchers. We're ready with facts, figures and recommendations that should be profitable to you. Air Products, Inc., Allentown, Pa.

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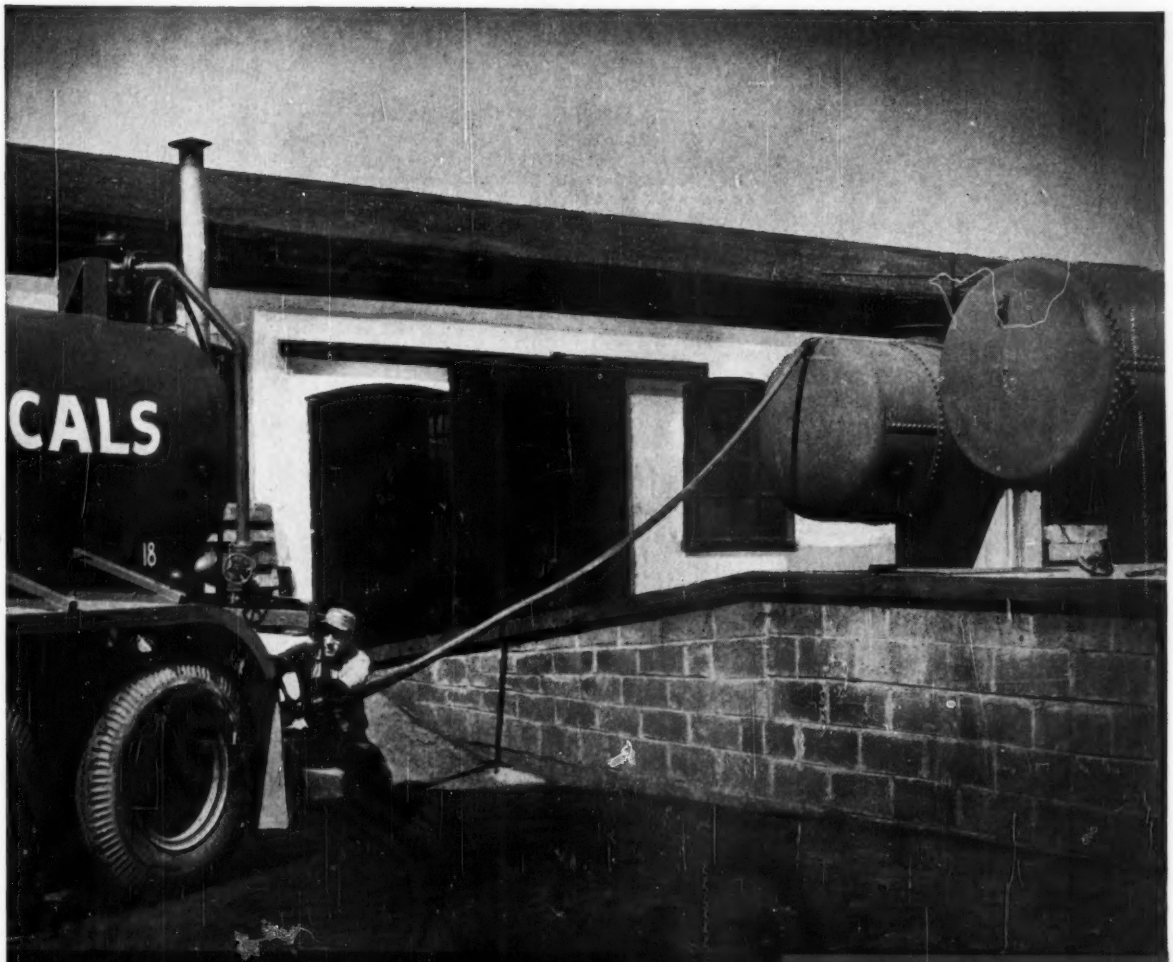

Better than any other acid hose we've ever used

After handling many makes of acid hose the chemical operator at this plant has found that Acme-Hamilton acid discharge hose is outlasting the others, remains flexible even when cold, and is highly resistant to weathering. This A-H hose has been in service 2 years conveying 2,000 gallons of commercial sulphuric acid per week.

Acid Discharge Hose

(A) Cover. Tough abrasion and acid resistant rubber. Hose ends are rubber sealed.

(B) Carcass. Multiple fabric plies withstand pumping pressures, provide high degree of flexibility.

(C) Tube. Pure gum; will handle wide range of acids, salts and alkalis. (Can also be furnished with Hypalon* tube for special applications.)

Write Dept. C-1. *Du Pont T. M.

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LETTERS

Polypropylene Credit

TO THE EDITOR: In discussing Esso's polypropylene unit (*May 21, pp. 83, 84*) [you] state that most producers of polypropylene "are licensees to the original process developed in 1953 by Karl Ziegler."

For the record, Ziegler's work in '53 dealt with the production of linear polyethylene only and not isotactic polypropylene. Giulio Natta, on the other hand, was the first person to produce isotactic polypropylene. Let me refer to a joint Ziegler-Montecatini statement published in the Dec. 13, '58 issue of CHEMICAL WEEK, p. 23, which said in part:

"This agreement was reached after the following developments had taken place: Montecatini became, in Jan. '53, one of the earliest licensees of Ziegler's '53 invention of new complex organometallic catalysts and the possibility of polymerizing ethylene to high polymers with the aid of them was disclosed to Montecatini in Dec. '53.

"Shortly after this disclosure, Professor (Giulio) Natta, Montecatini's consultant, working with Ziegler-type catalysts, succeeded in discovering sterically differentiated polypropylene, and somewhat later he discovered stereospecific catalysis and invented his stereospecific propylene polymerization processes."

On p. 84 (Esso article) you state: "Much of the work on cleaning up these materials was done by Giulio Natta working with Karl Ziegler on early production of the plastic." Actually Natta and Ziegler did not work together on early production of the plastic. . . .

MARIO L. OTTOLENGHI
Vice-President
Novamont Corp.
New York

Nylon 6 Down Under

TO THE EDITOR: . . . You state (*June 4, p. 17*) that the plant Allied Chemical is proposing to set up in Australia would be "Australia's first nylon plant." This statement is completely untrue. British Nylon Spinners (Australia) Pty. Ltd., a wholly owned subsidiary company of ours first began producing nylon yarn at a plant at Bayswater near Melbourne in '58. The nylon produced there is nylon 6/6 and enough is produced to supply the textile needs of Australia.

MARGARET REEKIE
British Nylon Spinners Ltd.
London

Our report should have called it "the first nylon 6 plant."—ED.

MEETINGS

Gordon Research Conferences at Colby Junior College, New London, N.H.—July 4-8, polymers; July 11-15, textiles; July 18-22, corrosion; July 25-29, separation and purification; Aug. 1-5, instrumentation; Aug. 8-12, food and nutrition; Aug. 15-19, medicinal chemistry; Aug. 22-26, catalysis; Aug. 29-Sept. 2, cancer.

Gordon Research Conferences at New Hampton School, New Hampton, N.H.—July 4-8, chemistry and physics of isotopes; July 11-15, statistics in chemistry and chemical engineering; July 18-22, radiation chemistry; July 25-29, organic reactions and processes; Aug. 1-5, steroids and other natural products; Aug. 8-12, organic coatings; Aug. 15-19, analytical chemistry; Aug. 22-26, inorganic chemistry; Aug. 29-Sept. 2, adhesion.

Gordon Research Conferences at Kimball Union Academy, Meriden, N.H.—July 4-8, chemistry at interfaces; July 11-15, chemistry, physiology and structure of bones and teeth; July 18-22, high-pressure research; July 25-29, chemistry and metallurgy of semiconductors; Aug. 1-5, solid-state studies in ceramics; Aug. 8-12, chemistry and physics of solids: point defects; Aug. 15-19, toxicology and safety evaluations; Aug. 22-26, infrared spectroscopy; Aug. 29-Sept. 2, high-temperature chemistry: kinetics of vaporization and condensation processes.

Columbia University Industrial Research Conference, Arden House, Harriman, N.Y., Aug. 7-13.

Heat Transfer Conference and Exhibit, Statler-Hilton Hotel, Buffalo, N.Y., Aug. 15-17.

Cryogenic Engineering Conference, University of Colorado, Boulder, Colo., Aug. 22-24.

Technical Assn. of the Pulp and Paper Industry, alkaline pulping conference, Multnomah Hotel, Portland, Ore., Aug. 22-24.

Joint Automatic Control Conference, Massachusetts Institute of Technology, Cambridge, Mass., Sept. 7-9.

American Chemical Society, National meeting, New York, N.Y., Sept. 11-16.

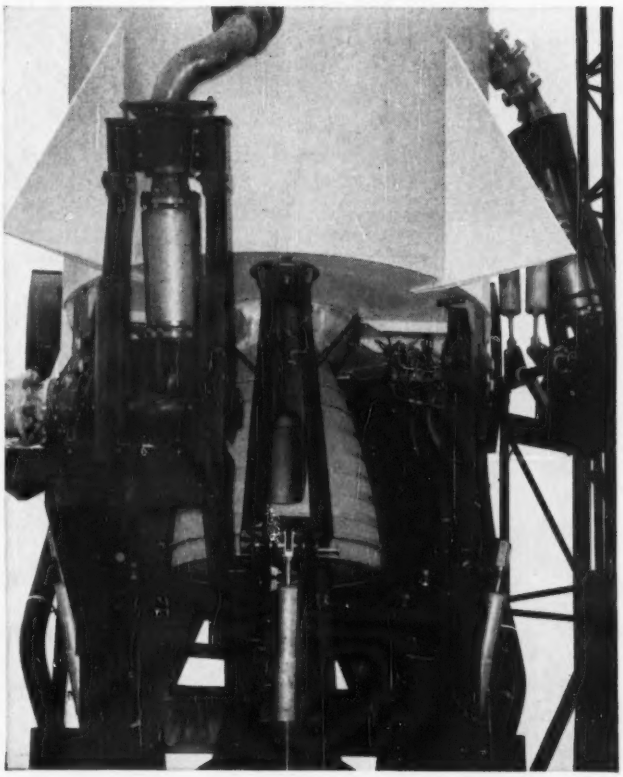
Society of Plastic Engineers, conference, theme: plastics in business machinery; Binghamton, N.Y., Sept. 22.

3M COMPANY CHEMICALS

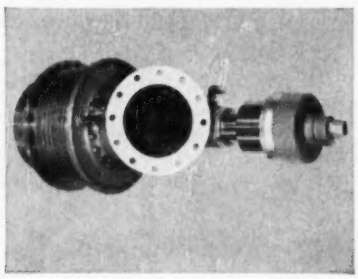
THE RAW MATERIALS OF PROGRESS

Seals of KEL-F® Brand Plastic give missile fueling leakage the cold shoulder

When missile fueling operations begin, leakage is a critical hazard. LOX at —297°, liquid nitrogen at —320°, liquid hydrogen at —432° F.—fuels so cold heavy icing forms on ground fueling lines—are pumped into the missile. The problem? To find a material for a seal in a fill valve that stands up under extreme cold thus preventing leakage. The Missile Development Division of North American Aviation, developers of fill valves for fueling equipment (see cut below), and the Parker Aircraft Company, Los Angeles, manufacturers of these valves, found that ordinary materials became rigid, even shattered under such low temperature conditions. The result: dangerous leakage, possible contamination of the fuel itself.



The answer: KEL-F Brand Halofluorocarbon Plastic from 3M Company, which was the only



material these companies found that not only remained flexible at low temperatures, but was impervious to the action of corrosive chemicals and highly resistant to organic solvents. In addition, KEL-F offered high impact and compressive strength and the resultant resistance to cold flow.

KEL-F Brand Plastic is ideally suited for many uses in the field of missiles, rockets and aircraft because it is chemically inert, thermally stable, has zero moisture absorption and can be molded with conventional equipment to any desired shape. Among its many uses; O-rings, LOX lip seals, coated wire, gaskets, tubing, vent seals and fuel bladders.

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NEW HALF SECOND BUTYRATE/RESIN COMBINATIONS PRODUCE SUPERIOR COATINGS

Half-Second Butyrate has become widely accepted among lacquer formulators as a major film-forming material. Coatings based on it are noted for their low color, non-yellowing characteristics, toughness, flexibility, outdoor durability and high gloss.

Now even greater advantage can be taken of these properties. For recent work has shown that a number of important resins not generally considered in the formulation of Butyrate coatings can in fact be combined with Half-Second Butyrate to produce finishes of outstanding performance.

In many of these finishes, Half-Second Butyrate serves as a modifying resin; in others, it is the basic film-former. In either case, the combination results in coatings whose properties are significantly superior to those obtainable from either resin alone.

The characteristics of a number of these combinations are described here.

HSB/Amino *Amino* resins modified with Half-Second Butyrate produce lacquers of increased toughness, improved sprayability and flow-out, more rapid air-dry and outstanding weather resistance. Half-Second Butyrate modified with amino resins, on the other hand, offers improved adhesion and abrasion resistance, and increased heat and solvent resistance. In both cases, the amino resins crosslink with the hydroxyl groups on the cellulose acetate butyrate molecule.

HSB/Epoxy *Epoxy* resins of low molecular weight are used to modify Half-Second Butyrate to produce coatings with improved adhesion. In epoxy-butyrate-amino formulations, the epoxy resin acts to stabilize the system, increasing its storage stability significantly. Such formulations exhibit great toughness and flexibility.

HSB/Polyurethane *Polyurethane* systems show improved build and better flow characteristics with the addition of a Butyrate resin such as EAB-381-20. This resin has a higher viscosity than has Half-Second Butyrate.

HSB/Silicone *Silicone* resins, when added to Half-Second Butyrate formulations, further improve their outdoor durability and high gloss retention characteristics.

HSB/Acrylic *Acrylic* resins, in combination with Half-Second Butyrate, show improved film performance in several ways over formulations based on acrylics alone. Use of Half-Second Butyrate builds solids content, improves sprayability, and imparts better solvent release characteristics. In addition, the coating is tougher and shows better weather resistance and gloss retention. The excellent adhesion and alkali resistance of Butyrate-acrylic formulations suggests their use on exterior structural aluminum.

HSB/Maleated vinyl *Maleated vinyl* resins may be used—and only relatively small amounts are required—to improve the initial toughness and adhesion of Butyrate-acrylic films.

HSB/Oil-free alkyds *Oil-free alkyds*, when incorporated in Half-Second Butyrate formulations, serve to improve adhesion and toughness.

HSB/Polyester *Polyester* resins can be modified with up to 15% Half-Second Butyrate. The addition of Butyrate resins promotes leveling and brings about a sharp reduction in tack-free time.

The results of these studies of Butyrate/Resin combinations are discussed in detail in Eastman's **"Formulator's Notes 0.3."** Starting formulations are included. Write or call the nearest Eastman sales office for your copy.

HALF SECOND BUTYRATE

an Eastman film-former

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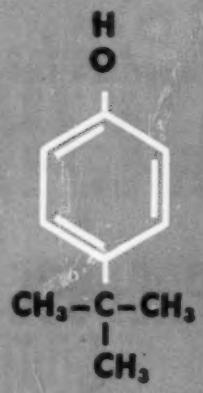

Now in commercial production at Stepan's new Millsdale, Illinois plant (near Joliet) is p-tert-Butylphenol. This new Stepan product . . . one of a series of Stepan substituted phenols . . . can be supplied flaked or as a concentrated solution in caustic. Bulk shipments of the molten Butylphenol can also be made where required. There are a number of interesting commercial and potential uses for p-tert-Butylphenol, and we would be pleased to send you working samples for your evaluation.

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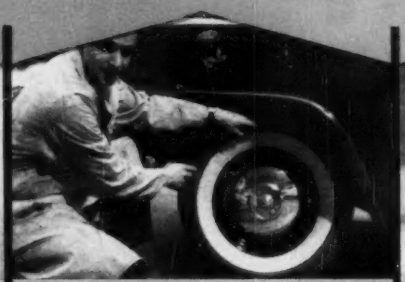
p-tert-Butylphenol-formaldehyde resins impart rapid drying properties to varnishes, along with improved hardness and durability.



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Business
Newsletter

CHEMICAL WEEK
July 2, 1960

Word is out that Reichhold Chemicals will move into vinyl acetate monomer production—and present producers are wincing in anticipation. Chief reason: total U.S. monomer capacity already in place is considerably in excess of demand.

An agreement for technical know-how has been signed with Wacker Chemie GmbH. (Munich, West Germany), and President Henry Reichhold indicates that location of a 50-million-lbs./year plant will depend on negotiations (currently under way) for an acetylene source.

The new plant's output will go into the company's fast-growing polyvinyl emulsions for paints, adhesives, textiles and paper. But company officials hint that "other outlets" are projected, and that the new installation can be readily expanded to 100 million lbs./year.

That's why the industry is perplexed. While vinyl acetate monomer capacity is now about 380 million lbs./year (including a Canadian Shawinigan Chemicals plant), total demand this year may hit only about 230 million lbs. (*CW Acetylene Report, March 26, p. 53*).

•

Two more projects to produce aromatics from petroleum:

• British American Oil's Montreal East refinery is planning to award contracts by Aug. 1 for construction of a $2.5-million aromatics extraction plant. Construction will begin this fall and completion is planned for next July 1. The plant will be a Udex aromatics unit (developed by Universal Oil Products and Dow Chemical). Prime product: benzene, required for the cumene operation at Shawinigan's nearby petrochemical plant. The unit will be designed with provision for future production of other aromatics—toluene and xylenes.

• Suntide Refining Co., subsidiary of Sunray Mid-Continent Oil Co., will build a hydroalkylation unit at its Corpus Christi, Tex., refinery. The Hydeal unit will cost more than $1 million, will produce benzene from toluene, is expected onstream in early '61.

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Goodyear has purchased a 422-acre site for its polyisoprene and polybutadiene rubber plant. The long-awaited, $25-million plant—officially reported in May as slated for the Beaumont, Tex., area (*CW, May 28, p. 67*)—will go up on a rectangular tract bounded on the east by Cheek Road and by the Lower Neches Valley Authority Canal. The site is served by two highways and the Santa Fe Railway. Initial construction will utilize 60 acres; the remainder is for future expansion. Eventual production capacity: about 30,000 tons/year.

•

Two U.S. companies have established foreign subsidiaries:

• Mead Corp. (Dayton, O.), manufacturer of pulp and paper

products, has set up its first foreign subsidiary in 114 years of operation—Mead S.A., with headquarters in Zurich. The wholly owned subsidiary will engage both in sales and licensing activities, will explore possibilities of manufacturing overseas.

• Olin Mathieson's new company, Olin Mathieson Middle East, S.A. (Beirut, Lebanon), has been organized to develop corporate interests in the Near and Middle East, India and Africa. Managing director of the new company: Gordon K. Phillips, regional vice-president of OM International.

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Rexall is closer to its big move into polyolefins. It's planning to lump all its plastics and chemical operations into the new subsidiary it's setting up with El Paso Natural Gas in a $75-million, 50-50 venture that's still unnamed (*CW Business Newsletter, May 7*).

Right now Rexall uses polyethylene and other polyolefins at the rate of 50 million lbs./year, will market at least 100 million lbs./year when the subsidiary's plant at Odessa, Tex., comes in. Although that plant isn't expected onstream until late '61 or early '62, look for Rexall to be organizing a sales group and developing markets far in advance of actual production.

If the firm should plan to buy polymer for earlier marketing the trade speculates the resins may come from Europe. Rexall President Justin Dart, now on the Continent, may be studying possible purchases of polymer, exchanges of know-how, or other deals abroad.

•

Continental Oil is making its entry into the plastics field. Board of directors of both Continental Oil and Carlon Products (Aurora, O.)—a leading producer of plastic pipe—have approved a proposal for Continental to purchase up to 50% of Carlon stock and receive two seats on Carlon's board.

Officials of both companies say that Continental's initial interest lies in Carlon's wide range of pipe—polyethylene, polyvinyl chloride and acrylonitrile-butadiene-styrene—all gaining use steadily in the petroleum industry for salt-water drainage and distribution lines. Although both companies deny there's any specific agreement on future "raw-materials purchases from Continental for Carlon pipe products," industry has it that Continental has been making plans for polyolefin production in the near future.

•

The Hercules-Beaunit merger talks are off. Both companies declined comment other than that no agreement could be reached on a satisfactory contract. The 25-year supplier-customer relationship will be continued, however (*CW, June 18, p. 14*).

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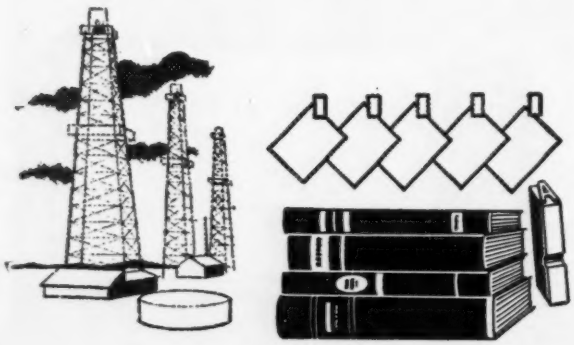

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CW PHOTO—PAT MURPHY

Near Mexico City, delegates visiting Pemex's Atzcapotzalco refinery view scale model of that plant.

Mexico's Chemical Drive Accelerates

Some 700 U.S. chemical engineers —in Mexico City last week for the first international congress of chemical engineering—heard almost as much about the Mexican industry's high hopes for rapid growth as they did about technical developments. As the enthusiastic leaders of Mexico's chemical industry see it, the growth would make that nation the leader in the much talked about but still embryonic Latin-American free-trade zone.

The six-day meeting—the total attendance of more than 1,000 sometimes overtaxed the facilities of the Del Prado, a modernistic, 11-story tourist hotel—was itself a sign of the country's sudden interest in building up a strong chemical industry. The congress was jointly sponsored by the American Institute of Chemical Engineers and its south-of-the-border equivalent, the Instituto Mexicano de Ingenieros Quimicos, which was organized just two years ago and now has about 300 members.

For the Mexican engineers, the meeting was an opportunity to cement their professional bonds, exchange information among themselves and with delegates from other lands, and to set the stage for regular yearly sessions. For visiting engineers, it was an opportunity to view some of the modern process plants already operating around the colorful capital city (*picture, above*) and to appraise the probable pace and direction of Mexico's future CPI growth.

Chemicals Pace Industry: Mexico's chemical and industrial development is still a long way behind that of highly industrialized nations like the U.S. and Britain, of course. Aside from the "extractive" industries, industrialization didn't really get started until World War II. First Mexico had to struggle back to its feet after the three decades of devastation that accompanied the 1910-22 revolution and the shocks of the great depression.

But from '39 to '58 manufacturing output nearly quadrupled. And chemical production has risen even faster than over-all industrial output. In the past 10 years sulfuric acid consumption rose 500%, to 221,000 metric tons in '59—all of it supplied by domestic producers. Alkali consumption rose 80% in the past nine years, but domestic production—hampered by lack of chlorine outlets—supplied only 37% of the market.

Over-all, said Dow Chemical of Mexico's Enrique Rengel de Trevino at one of the technical sessions at last week's meeting, Mexican chemical industry growth has varied over the past five years, ranging from 10%/year in basic products to 25-30%/year in in-

CW PHOTO—PETER WEAVER

Industrial banker Navarrete: he can act as lender, partner, or proprietor.

termediate and finished products. And it's expected to continue at similar rates for another decade.

'Los Americanos' Coming: U.S. companies are moving to cash in on this growth. Between '58 and '59 foreign investments in Mexico—mostly from the U.S.—jumped 33%. A good chunk of this went into chemical projects.

Right now, aside from the government's own vast petrochemical plans, more than a dozen chemical projects are under way or coming up, and numerous U.S. chemical companies are involved. Du Pont, for example, has just completed and expanded its titanium dioxide plant, now plans a Freon plant to supply the 500-metric tons/year market for these refrigerants. Miles Laboratories, winner of the battle over who would build Mexico's citric acid plant, has broken ground for the project. Diamond Alkali's International Division is reported expanding its DDT plant. Dow plans to go into urethane foam production. Borden will soon announce another venture—its third in Mexico.

And other projects are in the works. Sintesis Organicas is getting ready to produce phthalic esters. Celulose y Derivados is building a nylon 6 and nylon 6/6 plant. Farbwerke Hoechst has bought land for a pigments plant. Still other prospective deals are pending before government officials or are being talked up by local producers and financiers.

Quiet Revolution: Unlike a lot of Latin-American hot-spots, the fireworks stage of Mexico's political history seems to have passed, and the nation has settled down to the business of self-development still called "the revolution." Although the revolutionary fires have long cooled, the goals of the revolutionists still seem very much alive in the young men who hold many top jobs in government and industry.

Mexico—like most of the developing countries—is determined to better its standard of living. (Per-capita income averages only about $270/-year.) And it is just as determined to keep its economy in Mexican hands. Alfredo Navarrete, youthful general manager of Nacional Financiera, the government's development bank, explains it this way:

"To understand Mexico, you must see it in motion. When the revolution started, our industries were all foreign owned. We were foreigners in our own country. We don't want to go back to that. We don't want to raise our children to be employees of foreign companies. And we want no businesses with phony 'Mexican fronts'."

But Mexico's ruling party, Partido Revolucionario Institucional (PRI), realizes that foreign companies can play a major role in developing industry. This attitude, plus PRI's ability to hold in check sporadic outbursts from discontented groups, has helped make Mexico attractive to foreign investors.

So have the government's economic policies, which have controlled inflation and brought foreign reserves to a reasonably healthy level.

Under President Adolfo Lopez Mateos, who took office in '58, business prospects look better than ever. He has cleaned up a lot (though not all) of the corruption that characterizes Latin-American politics. And with his background as Minister of Labor, he has helped settle some stormy labor problems, while holding wage increases to a noninflationary level.

Induced Industrialization: To develop industry and at the same time hold to its "Mexico for Mexicans" policy, the government has had to move firmly into the business picture. It controls prices on key products and services, approves labor contracts and has the final say on all industrial projects. It believes competition for a limited market can be damaging to all concerned and willingly grants monopolies. But to get the government's blessing for a project, you have to assure it that, later on, prices won't go up and quality down.

And the government has involved itself more directly in business. The major vehicle for this industrial activity is Nacional Financiera. This bank lines up industrial opportunities, tries to interest private business men in them, provides credits, invests as a partner or—if necessary—as sole owner. The goal is industrialization, not socialism; and the government's share in total investments has shrunk from 45% to about one-third.

Still, Nacional Financiera is in on a lot of new projects. Among its recent CPI ventures: Fertilizantes Mondova (fertilizers), Montrose Mexicana (insecticides), and Fabricas Tuxtepec (paper), in all of which it holds a one-third interest; and Atenquique (cellulose), of which it is sole owner.

Petrochemical Power: But the biggest and most controversial of all governmental industry programs is the vast petrochemical plan being undertaken by Petroleos Mexicanos (Pemex), the agency that controls all of the country's petroleum production, refining and distribution. Pemex has staked out for itself production of all "basic" petrochemicals (such as ethylene) and a still undetermined number of secondary products.

Under Pascual Gutierrez Roldan, Pemex plans to put up 28 plants that will have an annual capacity of some 600,000 tons of products such as ammonium sulfide, anhydrous ammonia, benzene, toluene, *m*-xylene, ethyl benzene, styrene, isopropyl benzene, butadiene, synthetic rubber, polyethylene, tetraethyl lead, ethylene dichloride and sulfur. Plants to make acetylene, vinyl chloride and caprolactam are also being considered.

Can They Deliver? Critics are questioning whether Pemex will be able to carry out this gargantuan plan efficiently. One plant manager told CHEMICAL WEEK that Pemex would be lucky to get the plants onstream in five years, let alone the two years planned.

Pemex supporters point out that

the government has been forced to try the plan—private industry had failed to move into these fields and the program is needed to provide raw materials for industrial growth.

Even Pemex's critics admit that its plan would clear the way for many petrochemical projects based on materials from the Pemex plants. Dow, for example, has surplus chlorine at its caustic soda plant. When Pemex starts turning out ethylene and ethylene dichloride, Dow may be able to supply Pemex the chlorine to make EDC, which it could then buy and convert into vinyl chloride.

Even if Pemex decides to produce the vinyl monomer itself—and there's a chance that it might pick Dow and other companies as minority partners in several projects—Dow would still have a possible outlet for its chlorine. A Dow sales executive, Edward Watson sees opportunities for Dow to go into the entire glycols field, using Pemex intermediates. "Now that the Pemex policy is becoming clear," he adds, "you can count on Dow Quimica Mexicana to go heavily into petrochemicals."

Taking Back-Seat Roles: Whatever U.S. companies choose to produce in Mexico, it's almost certain that they'll have to take less than a 50% equity interest. That has been the government's firm though unwritten policy. The trend now is toward three-way ventures, with shares split evenly among the foreign investor, private Mexican interests, and the government.

With Mexicans becoming more industry-minded, they are looking for more joint ventures with foreign firms. A number of such deals have been promoted by Intercontinental Corp., a financing company with strong international connections. With Italy's Ladoga Laboratories, Intercontinental has set up Sucro-Quimica to produce furfural and other sugar derivatives; with Belgium's Syndicat Belge de Entreprises a l'Etranger, Intercontinental's coke-producing Hullera Mexicana has formed a subsidiary to produce activated carbon; and with Aluminum Co. of America, Intercontinental is building a $20-million aluminum plant in Veracruz.

Coming up: Intercontinental projects in alkali production, electrometallurgy, fertilizer, perhaps tetraethyl lead.

Gaps in Mexico's Chemical Output

Product	*1960 Market (metric tons)*	*Percentage supplied by local producers*	*Principal producers*
Aluminum sulfate	13,000	**95%**	Alcamex, Productos Quimicos Mexicanos
Ammonium chloride	700	**20%**	Sales Industriales
Ammonium sulfate	120,000	**90%**	Guanos y Fertilizantes, Compania Mexicana de Coque y Derivados
Antibiotics	(*)	**0**	———
Calcium hypochlorite	250	**0**	———
Calcium phosphate	2,600	**0**	———
Carbon black	10,000	**0**	———
Essential oils	(**)	**0**	———
Hydrochloric acid	10,000	**90%**	Sosa de Mexico, Productos Quimicos Mexicanos, Industrial Quimica Pennsalt, Industria Nacional Quimica Farmaceutica
Inorganic acetates	2,000	**0**	———
Parathion	2,000	**0**	———
Phenol	800	**0**	———
Phosphate rock	70,000	**0**	———
Potassium chloride	10,000	**0**	———
Soda ash	100,000	**50%**	Sosa Texcoco
Sodium benzoate	200	**0**	———
Sodium glutamate	100	**0**	———
Sodium nitrate	9,000	**0**	———
Sodium sulfide	3,000	**70%**	Industria Nacional Quimica Farmaceutica
Sodium thiosulfate	900	**80%**	Industria Nacional Quimica Farmaceutica
Synthetic resins:			
Alkyd resins	6,000	**70%**	Southern Chemical, Reichhold, Celanese
Phenolic resins	2,000	**70%**	Bakelite, Adhesivos Resistol
Styrene resins	6,000	**0**	———
Urea-formaldehyde resins	2,500	**80%**	Casco Quimica, Industria Schwarz, Adhesivos Resistol
Vinyl resins	5,000	**0**	———
Zinc chloride	700	**30%**	Sales Industriales

* Value estimated at $64 million.
** Value estimated at $5.1 million.

Free-Trade Hopes: Although many U.S. economists say it won't work, Mexican chemical men have great hopes for the embryonic Latin-American free-trade zone, which aims to eliminate trade barriers in 12 years between Mexico, Argentina, Brazil, Chile, Paraguay, Uruguay and Peru.

"It's just a dream at present," admits L. M. Aguilar, general director of Ferro Enamel de Mexico. But he, like many other Latin Americans, believes the dream will come true.

Dramatic steps—e.g., building large-scale plants to serve the whole market—are still a long way off, at least for private producers. But Mateos reportedly ordered Pemex to increase planned capacity for some products, including tetraethyl lead and ethylene dichloride for export.

Private companies are stepping up their sales efforts. Ferro's Aguilar, for example, is already exporting to several South American countries, will soon open offices in Colombia and Peru.

Mexican chemical industry men believe they will be leaders in the free-trade zone. They have a strong raw-materials position, relatively low labor costs, a growing equipment industry, and experience in adapting U.S. technology to Latin-American conditions.

Diversifying into Drugs

Dixon Chemical & Research—an aggressive young company that has pushed into the front ranks of heavy-chemicals producers in just six years (CW, Sept. 12, '59, p. 40)—now is planning to establish itself on an equally strong footing in the drug industry.

First step in its plan: a recent agreement to buy into Kaltman & Co., Inc., wholesale distributor of drugs and pharmaceuticals in the East. Dixon plans to buy 100,000 shares of Kaltman stock for $500,000 immediately with warrants to acquire an additional 500,000 shares at $6.50/-share in the next three years. If the warrants are exercised, Dixon could hold up to 26% of the stock of the publicly owned wholesaler.

This "side entrance' to the drug industry might not appear to be a major move. But Robert Buckalew, vice-president of Dixon and a former marketing man with Warner-Lambert Pharmacal Co., holds that the Kaltman stock acquisition is "a key stepping stone."

Already Dixon is considering several other wholesale drug acquisitions. If these go through, Dixon may have a drug empire with sales in the $100-million range.

Here's how Buckalew optimistically outlines the plan:

- Acquisition of several wholesalers.
- Establishment of a private-brands division.
- Acquisition of producers of ethical and proprietary pharmaceuticals, cosmetics, surgical supplies, even veterinary drugs, if potential is right.
- Manufacture of drugs, either at the plants of companies to be acquired or by moving acquired operations nearer to Dixon's plants.

Kaltman a Key: How is a distributor such as Kaltman a key to such a giant venture? Buckalew explains it this way:

At the same time it is acquiring Kaltman stock, Dixon is establishing a pharmaceutical subsidiary. One of the company's first undertakings: setting up a private-brands division. At first, Dixon says, it will buy products, perhaps ranging from shampoo to insecticides, sell them under a name such as "Dixco."

Utilizing such methods as distribution of private brands—which have a much higher gross profit than brand-name items normally sold wholesale—the net profit for the entire Kaltman operation, Buckalew estimates, could be increased by as much as 60% on a relatively small increase in sales.

Not only will the move enable Dixon to expand the potential of Kaltman's sales force, but also it could pave the way for sales of the "Dixco" products that Dixon expects to manufacture eventually. Although the company would purchase such specialty products at first, it also plans acquisitions of producers.

Money for Acquisitions: Financing seems to be the least of Dixon's worries. Officials hold that Dixon has always had the backing of blue-ribbon investment houses, say they could make even a $100-million purchase if the other company is the right one.

Tapping New Resources

Moves to develop three Canadian resources — hydrocarbons, hydropower and phosphate ore—are causing repercussions in various segments of the process industries in the U.S. this week.

- Petrochemical companies interested in building new plants in the North Central states are waiting to see whether Alberta's Oil and Gas Conservation Board will (a) approve Pembina Pipe Line's plan for a $150-million project to pipe LPG liquids (and possibly sulfur) into Minnesota, Wisconsin and Illinois, or (b) consider counterproposals by three other Canadian concerns.
- Aluminum and electrochemical producers are eyeing a new plan for developing hydroelectric power on the Peace and Columbia rivers. The proposal envisions a huge, two-nation power pool in six states and two provinces, with intersystem transmission lines to greatly increase the amount of firm power available.
- Several U.S. chemical companies reportedly are studying the possible development of a phosphate ore body in the Upper Lake region of northern Ontario. President E. F. Carr of Multi-Minerals Ltd. (Toronto) holds that production of phosphoric acid and other derivatives appears feasible in that sulfuric acid would be available from existing plants in Ontario.

Merging for Money

Spencer Chemical's proposed merger with Pittsburg and Midway Coal Mining Co. is expected to be ratified by Spencer's stockholders this week. It will put 41-year-old John Denton at the head of a diversified company with six chemical and plastics plants and seven coal mines doing business at the rate of $75 million/year.

There has always been a lively friendship between the two Kansas-born companies. Spencer was founded by the late Kenneth A. Spencer when he was Pittsburg's general manager and treasurer; his brother, H. H. Spencer, is chairman of Pittsburg's board and a member of Spencer's board; members of the Spencer family and several other individuals own considerable stock in both companies; and Pittsburg still owns 37,738 shares of Spencer stock.

Also, Spencer has been buying about $280,000 worth of coal yearly from Pittsburg; and Spencer has used samples of Pittsburg's bituminous coal in several research projects relating to hydrogenation, gasification and other processes to produce chemical feedstocks from coal. (It's believed that for the time being, at least, the findings from those studies have been filed and forgotten.)

But in acquiring the coal company that created it, Spencer is not acting out of sentiment. More material motives: to boost over-all profitability; to tighten organizational and capital structure; to give Spencer a broader operating base with greater financial resources and stability; and above all, to even out Spencer's sales revenues, which—despite increasing diversification into plastics and industrial chemicals—still have a seasonal peak-and-valley pattern stemming from the company's traditional business of fertilizer chemicals.

If stockholders give their blessing to management's plans, these moves will follow in quick succession: Spencer's authorized common stock will be increased from 2 million to 5 million shares; the company will carry out a two-for-one stock split by issuing one new share for each share now held; Pittsburg will transfer its business and assets to Spencer; and Spencer will issue 529,290 shares for distribution to the holders of the 639,-540 outstanding shares of Pittsburg.

COMPANIES

Aerojet-General Corp. (Azusa, Calif.) has been awarded a $2.5-million Navy contract for production of the Tartar surface-to-air guided missile solid-propellant motor at its Sacramento plant.

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Consolidated Engravers (Charlotte, N.C.) is now a division of American-Marietta Co. (Chicago). Consolidated, which produces engraved cylinders for printing of textile fabrics and steel-embossed engravers for plastics, vinyl and other materials, will continue to operate under the direction of John Ladley, president.

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American Can Co. (New York) has filed with the Securities & Exchange Commission for an issue of $40 million in 30-year debentures. Proceeds of the issue will be used to reduce bank loans, $34 million of which were incurred in connection with the recent acquisition of 125,000 acres of timberland in Alabama through purchase of all outstanding stock of Allison Lumber Co. The company now plans to extend operations to manufacture and sale of glass containers. Wheaton Glass Co. (Millville, N.J.) will give technical assistance. Also reported: a second registration statement of 12,000 shares of 7% cumulative preferred stock ($25 par value) and 264,000 shares of common ($12.50 par value). Both offerings are planned for mid-July.

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Arapahoe Chemicals Inc. (Boulder, Calif.) has completed sale of 13,000 shares of no-par-value common stock at $22.50/share for 100% expansion of plant and physical facilities and for increased working capital.

EXPANSION

Pulp: Menasha Pulp and Paper Division of Menasha Wooden Ware (Menasha, Wis.) has awarded a contract for construction of a multimillion-dollar pulp and paper mill at North Bend, Ore., to Rust Engineering Co. (Pittsburgh, Pa.).

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Asphalt: Canadian Petrofina is spending more than $2 million to construct an asphalt plant at its Pointe-aux-Trembles refinery on Montreal Island. Construction is expected to take about seven months.

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Polyether Foam: Nopco Chemical Co. (Newark, N.J.) has purchased a 20-acre site in Chattanooga, Tenn., for its planned urethane foam plant (*CW Business Newsletter, May 7*). Engineering and construction plans are now under way, and production is slated for the end of '60.

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Xylene: Sinclair Petrochemicals will build a new unit at its Houston refineries to produce *o*-xylene to fill a three-year, 66-million-lbs./year contract with four Japanese trading companies—Mitsubishi International, Nissho American, Ataka New York and Toyomenka. The *o*-xylene will be processed into phthalic anhydride by Kawasaki Kasei Chemical Industries (Tokyo) and Japan Catalytic Chemical Industry (Osaka).

FOREIGN

Pharmaceuticals/Brazil: Mead Johnson Co. (Evansville, Ind.) has acquired the firm of Industria Farmaceutica Endochimica, S.A. (Sao Paulo) for more than $2 million. It's Mead Johnson's third international acquisition within one year; earlier, the company acquired Laboratoires Allard (Paris) and Productos Farmaceuticos Leo de Colombia, Limitada (Bogota, Colombia). The Brazilian company will operate as a separate corporation headed by S. W. Kapranos, Mead Johnson's vice-president for Latin-American operations. It produces 33 products in the vitamin, liver, hormone and pharmaceutical fields.

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East Germany/Investments: About $55 million will be invested in East German chemical industries in '60, according to the East German State Planning Commission. It will be a 15% investment increase over the preceding year. During the first four months of '60 chemical production reportedly rose 9.3%, compared with output in the same period of '59. Pharmaceuticals were up 24%; rubber, tires and asbestos, 14.1%.

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Development Fund/El Salvador: Members of the tripartite common market treaty have set up a $5.5-million Tripartite Development Fund headquartered at Tegucigalpa, Honduras, to grant loans both to governments and to private enterprise. Aim: simultaneous levels of development in each country. El Salvador and Guatemala each will contribute $2 million; Honduras, $1.5 million. If Costa Rica and Nicaragua sign the common market pact, they will put up additional capital.

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Butadiene, Methanol/England: British Hydrocarbon Chemicals has awarded a contract to Fluor Engineering and Construction (London) for building a butadiene extraction plant at BHC's Grangemouth, Scotland, works. BHC also plans a methanol plant to be designed and built by Chemical Construction Corp. (New York), and an ethylene dichloride plant at Grangemouth. Total planned expenditure for the three projects: about $14 million.

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Petrochemicals/Israel: U.S. investors are reportedly joining with the Israeli government in construction of a $5.25 million polyethylene plant. Reported to be one chief investor: North American Utility and Construction Co. (New York). A 24-million-lbs./year ethylene monomer plant would be built at the Haifa Oil Refineries' plant; half of the ethylene production will be used for polyethylene, the rest will be sold to other firms.

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Washington
Newsletter

CHEMICAL WEEK
July 2, 1960

Final version of the defense appropriation bill for fiscal '61 will be approved this week. It tacks on more money for missiles, manned aircraft, Polaris-missile subs and procurement.

The measure adds about $650 million to the $39.3 billion the President requested—a long way from the extra $3 billion Democrats talked of right after U-2. (Another $1.2 billion is covered in a separate military construction bill still going through Congress.) This is a total increase of only about 2%, but lawmakers have directed the Pentagon to make some major reshuffling in procurement plans.

The Senate-House Conference Committee is set to iron out differences between the two bodies. The Senate restored $294 million killed by the House for Boeing-Marquardt-Westinghouse Bomarc B missiles, knocked out the House's addition of $215 million for fighter planes. It also boosted funds for North American Aviation's B-70 bomber development (from $75 million to $360 million) and added millions for jet transports, Polaris-firing subs, Lockheed's Samos reconnaissance satellite, and an aircraft carrier. It voted against the House's $20.7-million hike for the Air Force's Minuteman ICBM development, however.

Most of Congress apparently goes along with the Administration's claim that the U. S. defense effort is adequate to cope with "cold war" threats. The massive overhaul in the budget for individual projects, however, reflects considerable Congressional disagreement over how to spend the $41 billion earmarked for Pentagon expenditure this year.

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Congress will probably vote a new federal minimum wage law. Only two possible roadblocks stand in the way of legislation to hike the current minimum wage to $1.25/hour and to bring some 4 million retail and service employees under the law's minimum wage and overtime provisions for the first time:

- Both the House and Senate labor committees have already approved "stepladder" minimum wage bills, similar enough to be compromised in legislative conference once approval is voted by both houses. However, the conservative House Rules Committee could delay such a vote. And an approaching adjournment date might prevent action.

- Eisenhower is almost sure to be unenthusiastic over a $1.25 minimum wage, may veto it.

Terms of new minimum-wage legislation, however, are already apparent. They would hike the present $1 minimum to $1.25 in a two-year period, would cover retail and service employees working in establishments doing $1-million annual business in interstate commerce.

Washington Newsletter

(Continued)

The government is acting to avert another "cranberry scare" involving residues of 2,4-D weed killer on wheat. Health, Education & Welfare Secy. Flemming is saying, in effect, "Don't get excited, we're not going to do you in."

Wheat farmers became alarmed after the state of Kansas announced it was going to start sampling wheat for residues. (Actually, no residues have been found.) At present there is no government-set tolerance for 2,4-D residues on wheat as there is on fruit, asparagus and some other crops. But this is only because the government has never had the occasion to set a tolerance; and Flemming makes it clear that if residues do show up in wheat he will have no difficulty finding a tolerable level.

The weed killer is not supposed to be used just before harvest time, and hasn't been as far as anyone knows. Flemming was sounded out by Sen. Frank Carlson (R., Kan.) after a Kansas City FDA official gave the impression publicly that the government might be getting ready to impound some wheat.

•

Money for three or four more desalting projects is called for in a new bill by Senate majority leader Lyndon Johnson (D., Tex.). A Senate interior subcommittee has approved legislation giving an additional $20 million over the next five years. A. L. Miller, director of the Office of Saline Water, is backing the increase to provide money for pilot plants using three or four more processes, wants to speed up development of the freezing process.

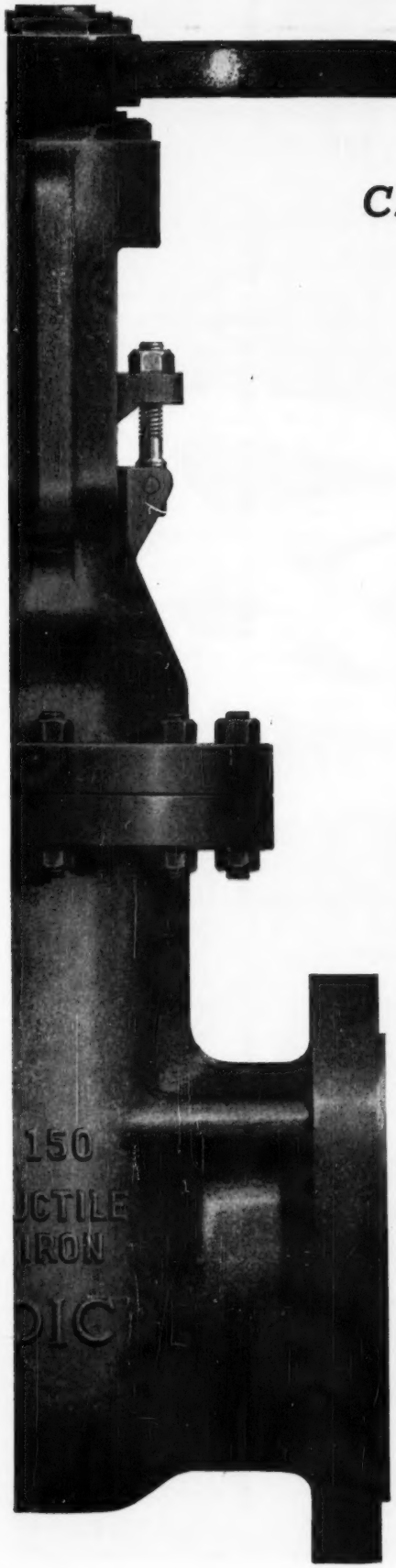
•

Congress may vote legislation to fix the price of lead-zinc from small mines. Oklahoma's Sen. Robert S. Kerr and Rep. Ed Edmondson are getting support for their bill, which would fix the price of lead at 17¢/lb. and zinc at 14½¢ when bought from mines turning out 2,000 tons or less of each metal a year.

The Kerr-Edmondson measure is set for an early vote in the House, and Senate passage is expected to follow. The Administration has abandoned earlier objections.

Higher tariff proposals for lead and zinc stand a slimmer chance. But a complex maneuver by Senator Kerr revived industry hopes for new protection. Kerr won House Ways & Means Committee approval for a new set of duty increases to replace more-restrictive provisions of another lead-zinc tariff bill sponsored by Rep. Howard Baker (R., Tenn.). The Kerr rates range from a 45¢ boost in zinc ore to a 93¢ rise on lead metal, plus additional increases when domestic prices fall below 13½¢ on lead, 12½¢ on zinc.

Kerr plans to get broad support by tacking his plan onto a Virgin Island tax bill already passed by the House. Kerr also will include an import quota on foreign shrimp in his basket of amendments.



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Awards' Aim: Bring Out Best in Researchers

Three new awards (below, in color) are providing added incentives for chemical researchers, as the trend to confer formal honor for outstanding work continues. But the very number of awards now offered (those listed are only a small part of the total) is making management think twice before sponsoring a society award, instituting one of its own or even entering its staffers in any of the various competitions.

The big question, in any case: Is the award really significant? Many awards carry considerable prestige, both to the recipient and to the donor. Others are just publicity gimmicks. Any company planning to establish an award must be careful to found it on a genuine need. If the award doesn't have a solid reason for being, it can't be an effective prestige builder.

The areas for awards are narrowing. National honors are already given in many chemical branches and specializations. Among them are these areas in chemical research: analytical, applied, biological, catalytic, cereal, colloid, dairy, enzyme, medical, petroleum, pure, rubber and textile, as well as for research in a particular product line—e.g., essential oils, iodine and glycerin. In addition companies and government agencies present internal awards to scientists who make outstanding contributions.

Top Newcomers: The three newest additions to the list of national awards are in distinct categories, each filling a particular need. The National Medal of Science, established last year by Public Law 86-209, is to be awarded by the President to as many as 20 scientists each year for "outstanding contributions to knowledge in the physical, biological, mathematical or engineering sciences."

Evidently inspired by the nation's purported "science lag," the original bill called for a National Order of Science, which would involve membership and a stipend of up to $10,000 as an award in addition to the medal.

The program is considerably less extensive now. And it is currently only in a preliminary stage: the National Science Foundation, which will administer the award (with help from the National Academy of Sciences), is still working on medal design. The National Medal, however, seems certain to become a coveted award.

A new national award of a completely different character is the F. S. Kipping Award in Organosilicon Chemistry, to be sponsored by Dow Corning Corp., and administered by the American Chemical Society. The $1,000 award will go to a scientist for "distinguished contribution to knowledge of organosilicon compounds."

One of the stipulations is that the award is open only to scientists engaged in noncommercial research, thus relieving Dow Corning of the problem of having to present the award to a researcher working for Dow Corning or for one of its competitors.

The third new award, recently conferred by the Synthetic Organic Chemical Manufacturers Assn. upon Purdue's Prof. Herbert Brown (*CW, June 25, p. 82*), is the SOCMA Award for Creative Research in Organic Chemistry. Designed as a companion to the SOCMA-sponsored ACS Award for Creative Work in Synthetic Organic Chemistry, the new award (a gold medal) is aimed at honoring the scientist himself for his general contributions in the field. The older award (a certificate and $1,000) honors a specific development. Some question as to the necessity of having both awards might be raised, since Brown won both this year, although this situation may not arise again.

'Award-Prone' People: Overlapping of purposes among various general awards has led to the development of a class of scientists who seem to be "award-prone." Top national figures in the science world and company presidents are almost sure to be

Array of Varied Chemical Achievement Awards

Award (year established)	*Donor*
Nobel Prize — Chemistry (1895)	Royal Swedish Academy of Science
Perkin Medal (1906)	Society of Chemical Industry
Chandler Medal (1910)	Columbia University
Priestley Medal (1922)	American Chemical Society
AIC Gold Medal (1925)	American Institute of Chemists
ACS Award in Pure Chemistry (1931)	ACS and Alpha Chi Sigma Fraternity
Eli Lilly & Co. Award in Biological Chemistry (1934)	ACS and Eli Lilly & Co.
Garvan Medal (1936)	ACS and F. P. Garvan
Borden Award in Chemistry of Milk (1938)	ACS and Borden Co.
Ipatieff Prize (1943)	ACS, V. & B. Ipatieff and Northwestern University
Olney Medal (1944)	American Assn. of Textile Chemists & Colorists and Howe Publishing Co.
Paul-Lewis Laboratories Award in Enzyme Chemistry (1945)	ACS and Paul-Lewis Laboratories
Chilean Iodine Educational Bureau Award (1947)	Chilean Iodine Educational Bureau
Fritzsche Award (1948)	ACS and Fritzsche Bros.
Precision Scientific Co. Award in Petroleum Chemistry (1948)	ACS and Precision Scientific Co.
Commercial Chemical Development Assn. Honor Award (1949)	Commercial Chemical Development Assn.
Carl Neuberg Medal (1950)	American Society of European Chemists
Glycerine Producers Assn. Research Awards (1952)	Glycerine Producers Assn.
Kendall Co. Award in Colloid Chemistry (1952)	ACS and Kendall Co.
ACS Award for Creative Work in Synthetic Organic Chemistry (1956)	ACS and Synthetic Organic Chemical Manufacturers Assn.
National Medal of Science (1959)	U.S. government
F. S. Kipping Award in Organosilicon Chemistry (1960)	ACS and Dow Corning Corp.
SOCMA Award for Creative Research in Organic Chemistry (1960)	Synthetic Organic Chemical Manufacturers Assn.

considered by many award givers. In most cases the recipients are eminently worthy of the honors they receive, but repetition tends to dull the impact of the honor for both the scientist and the public.

To prevent this circumstance from arising, Research Corp. (a foundation that makes research grants to educational and scientific institutions) traditionally confers its annual $2,500 award for an achievement that has not previously received other major honors. It notes that six of its last 24 award winners went on to receive Nobel Prizes, however.

Society Role: Professional societies play the predominant part in the granting of significant awards, although many of the honors are established and sponsored by companies. In most of these cases the award is given for work in a field that is of interest to the company. Borden Co. Foundation, for instance, sponsors at least eight awards ($1,000 and a gold medal for each) that are administered through various societies and associations. Topics: research in nutrition, dairy science, home economics, dairy cattle disease control, medical science, nutritive significance of dairy products, and poultry science. And in other cases, societies and trade associations sponsor their own awards aimed at spurring research activity in their special fields of interest.

The chemical profession is particularly well covered in terms of awards, with ACS alone participating in presentation of over 20 national awards and an even greater number of major divisional and sectional honors.

In some cases, however, societies themselves have concluded that there are enough awards in their field and are reluctant to offer new ones. The Manufacturing Chemists' Assn., for instance, confers annual awards upon chemistry teachers, but hasn't been able to justify offering any others. And the Engineers Joint Council has had a committee on honors to study the possibility of instituting a broad "engineer of the year" type of award. But consensus is against it. Reasons: criteria wouldn't be clear enough and there's no plain need for such an award (particularly since the new National Medal of Science has been established).

One often-interesting by-product of an award is the recipient's talk that generally follows the formal presentation. Professor Brown's SOCMA Award gave him an opportunity to deliver to a gathering of chemical executives a Dutch uncle lecture on the bad state of affairs in industrial research. And a word against those who picture industrial researchers as "organization men" recently was expressed by Linde Co.'s George Wagner as he received ACS's Western New York Section Schoellkopf Medal.

Internal Honorariums: Awards given by a company to its own employees provide a good means of acknowledging accomplishments and building morale—but only as long as the firm makes an award only when it is genuinely merited and as long as it is not a substitute for a salary raise. Among the many companies conferring internal research awards: Mobay Chemical, Goodyear Tire & Rubber, Abbott Laboratories and General Aniline & Film, each of which made recent presentations.

Government agencies also don't overlook the incentive values of awards. The Dept. of Agriculture, for instance, gives Superior Service Awards to its inventive researchers.

Sifting through the mounds of awards that are conferred today, one fact becomes evident: they offer management a relatively inexpensive way to get publicity, they encourage special types of research and they provide a means of rewarding employee achievements—but there must be a real reason for the honor, if it is to be effective.

Gauging Soviet Plastics

A score of American scientists at the recent International Symposium on Macromolecular Chemistry in Moscow got a good chance to swap notes with Russian plastics experts. Their consensus: Soviet plastics research, despite its current high priority, still lags that of the U. S. or Britain.

More than 1,200 scientists, about half from the Soviet and the others from 25 other countries (both Communist and non-Communist), presented more than 160 papers. Companies such as Esso Research and Engineering, Du Pont, Eastman Kodak and General Electric were represented.

Some Russian findings:

- Semiconductor properties have been found in condensation products of phthalic anhydride with hydroquinone.
- Thermal treatment of polyacrylonitrile synthesized by means of either ionic or radiation polymerization yielded substances having semiconductor properties.

But Westerners interviewed by CHEMICAL WEEK were unconvinced that the Soviets are anywhere near having practical polymer semiconductors.

They feel that the Russians are, however, building a strong foundation in polymer research for future achievements. Apparently the Soviets' biggest problem is their difficulty in making the transition from laboratory to full-scale production of new plastics.

LITERATURE

- All scientific research monitored by the Army Research Office, Office of the Chief of Research and Development, is available in condensed form in more than 3,000 pages of the 1960 Army Research Task Summary (ARTS). Vol. 7, offered for the first time, is a general cross-referenced index of ARTS. Order No. PB 161139 from the Office of Technical Services, Dept. of Commerce, Washington 25, D.C. Price: $3.
- A revised, expanded edition of the booklet "Dyeing Synthetic Fibers" (Booklet GS-66 Rev.) may be obtained by writing to the Dyestuff and Chemical Division, General Aniline & Film Corp. (435 Hudson St., New York 14).
- General Biochemicals, Inc. (67 Laboratory Park, Chagrin Falls, O.), offers a new 60-page catalog of its products (e.g., adenylates, nucleates) of interest to researchers in biology, etc. Included: fluorescein amine for the localization of antigen production.
- The Seventh Edition of "The Merck Index of Chemicals and Drugs," published and distributed by Merck & Co., Inc. (Rahway, N.J.), is available from Merck's Publications Dept. or bookdealers. It contains nearly 10,000 descriptions of individual substances, more than 3,300 structural formulas, and about 30,000 names of chemicals and drugs alphabetically arranged and cross-indexed. Price: $12.

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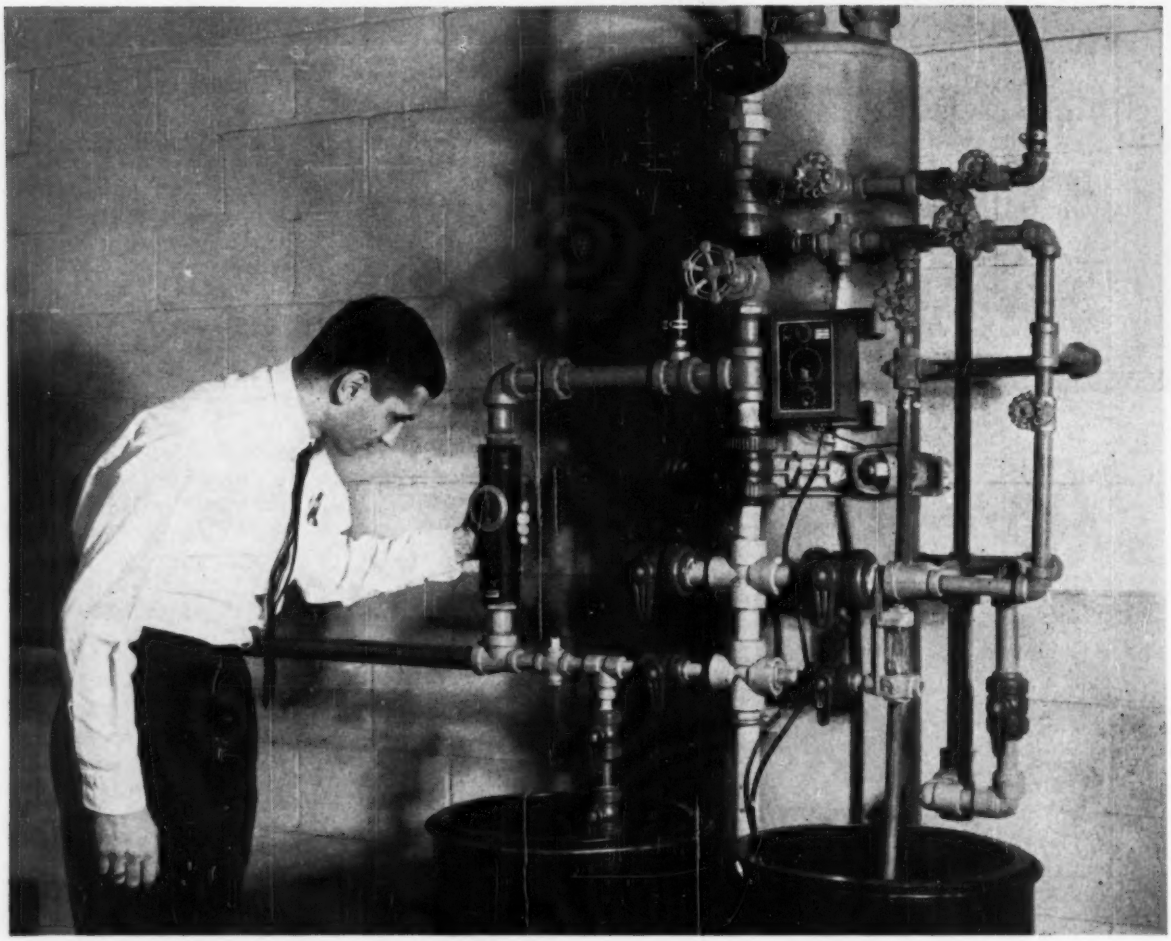

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Bulletin No. 989 provides complete specifications.

*Patent applied for

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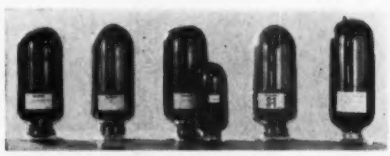

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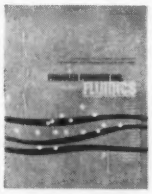

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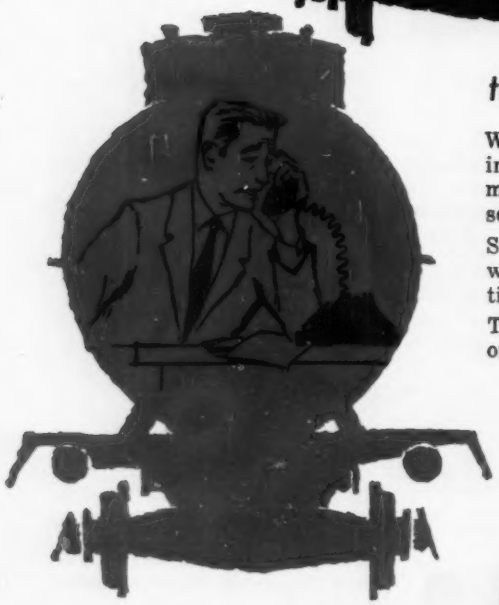

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CW PHOTO—JOAN SYDLOW

Interore's Ten Eyck: 'Overseas fertilizer selling is no cinch.'

Fertilizer Sales Chance?

Last week the United Nations' Food and Agriculture Organization launched a concerted drive to boost world food production through more intensive use of fertilizers. Seemingly, this five-year, 76-nation campaign presents a big sales opportunity for U.S. fertilizer producers. But so far their response has been cautious—and CHEMICAL WEEK's spot-check of fertilizer makers and traders shows why, points up the problems U.S. firms face overseas.

Of the fertilizer marketers studying these problems and the overseas sales potential, the internationally operating distributors and traders particularly stand to gain from stepped-up worldwide fertilizer consumption.

Sell, Trade or Barter: One is International Ore & Fertilizer Corp. (New York), largest independent firm engaged in international fertilizer trade.

Since World War II, Interore has become the biggest operator in the field. The firm began selling, trading and bartering fertilizer materials and sulfur in '48, handling some 40,000 tons that year.

Over the years, business expanded rapidly, and this year Interore's president, Hugh S. Ten Eyck, predicts volume will top 2.5 million tons—on nearly $60 million in sales.

The company now has a string of 29 offices around the world, strategically placed to keep a finger on the pulse of local markets and prices and to offer various services to its clients and customers. Among the services: assume title to materials, secure buyers, charter vessels, extend credit arrangements, help get customs clearance, documentation and insurance.

Of Interore's 2.5-million-tons annual business, about 40%—1 million tons—is in Florida phosphate rock. Principal markets: Japan, Western Europe. About 30%—750,000 tons—of the firm's volume is in nitrogenous materials, although little of this is U.S.-produced material.

The remaining 30% of Interore's business is divided evenly between potash (the firm handles only Potash Co. of America's material) and mixed materials.

Global Problems: Ten Eyck concedes that the ambitious UN program should contribute to the expansion of worldwide fertilizer markets and probably will help boost his firm's annual volume. But international trading in fertilizers, he says, is fraught with problems and pitfalls.

For one thing, he explains, competition is bound to stiffen, as potential markets get bigger, the returns greater. Result: probably more cut-throat pricing.

Sales of nitrogen materials, particularly, have been hurt by these tactics over the years. Surplus production has triggered profit-killing dumping in many areas. And the situation is not likely to improve soon. In fact it appears that it will worsen. Right now more than 2.25 million tons/year of nitrogen capacity is due onstream before '65 in major producing and consuming countries.

And Ten Eyck emphasizes that many farmers around the world don't use fertilizer at all, or at least don't use optimum amounts for crop yields. Thus they need technical aid in using

fertilizers properly, one problem the UN will work on.

Another source of worry is stiff competition from Iron Curtain countries. In most cases Interore doesn't try to undersell Red-bloc exports, simply concedes the business, hopes Communists don't step up their shipments. He adds, however, that recently Communist countries have actually taken more Western fertilizer materials than they've sold. Example: Red China now buys some 2 million tons/year from Western European nations.

Still another reason for lack of U.S. reaction to potential new overseas markets: American fertilizer exports dropped off significantly last year, from previous levels, while imports increased (*CW, March 12, p. 49*).

Producers' Views: Because of these problems both the National Agricultural Chemicals Assn. and the National Plant Food Institute (both in Washington, D.C.) report they have taken no position on the UN program—clear sign that their member companies show little enthusiasm for it. Both groups note, however, that they are "interested" and are following the UN activities closely.

At the present time, fewer than 10% of all U.S. producers sell fertilizer in foreign markets.

To a degree some U.S. producers have shown interest. International Minerals & Chemical Corp. (Skokie, Ill.), for example, told CHEMICAL WEEK it is "extremely interested" in the UN program, has sent a representative to observe the recent FAO meetings in Rome, Italy. Moreover, IMC reports, it now sells its materials in Europe and parts of South America and southeast Asia, is preparing to augment its overseas efforts soon.

And Olin Mathieson Chemical Corp.'s S. L. Nevins, vice-president of the company's Fertilizer Division, attended the Rome meetings as unofficial U.S. representative, is now trying to stir some enthusiasm for the program among U.S. producers.

Outlook: Despite Interore's optimism about the future of international fertilizer trading and the chances that the UN program will help boost consumption it's not likely that U.S. producers will provide any substantial support for the UN effort—or become very excited about overseas markets.

McKesson Sales Mark

Last week McKesson & Robbins, the nation's biggest distributor of drugs and chemicals, reported record sales of nearly $677 million during the year ending March 31, up 7.9% over a year ago.

Chemical sales—now about 10% of M&R's business—showed the greatest percentage growth: from $60 million reported last June to about $66 million in the most recent 12-month period. But growth in pharmaceuticals, which comprise 64% of the company's sales, contributed most in dollar-volume growth. Liquor sales made up the other 26%.

New chemical distribution points were established last year at Riverside, Calif.; Stamford, Conn.; Saginaw, Mich.; Duluth, Minn.; Charlotte, N.C., and Appleton, Wis.

McKesson & Robbins now has 49 chemical branch sales offices (last year, 44) and 101 chemical warehouses (last year, 80). The firm looks for annual chemical sales of $100 million within the next three to five years.

Borden Traffic Shift

Last week The Borden Chemical Co., a division of The Borden Co., set up its own chemical traffic department.

The move underscores Borden's growing involvement in chemical activities, points up the specialized nature of chemical shipping problems.

In the shift, Borden's former assistant corporate traffc manager, Raymond Rear, becomes head of the new chemical traffic group. His staff: 15 of the 50-man corporate traffic department.

Immediate purposes of the move: to help pave the way for Borden's joint petrochemical venture (with U.S. Rubber Co.) in the Southwest (*CW Business Newsletter, May 21.*)

DATA DIGEST

• **Refractories:** Folder describes properties and uses of various refractory materials. Among them: alumina, silica, silicon carbide, zircon refractories, basic refractories, castable refractories, acidproof brick and tile and plastic firebrick. Harbison-Walker Refractories Co. (Pittsburgh 22, Pa.).

• **Urethanes for Wood:** Folder describes two urethane resin systems useful for coating wood. Mixing and pot life, surface preparation and priming, and application and coverage are also described. B.B. Chemical Co. (784 Memorial Dr., Cambridge, Mass.).

• **Cyclobutane Derivatives:** Technical report outlines chemical and physical properties and reactions of tetramethyl-1,3-cyclobutanedione and its reduction product, 2,2,4,4-tetramethyl-1,3-cyclobutanediol. The materials are not yet being offered as development chemicals. Eastman Chemical Products, Inc. (Kingsport, Tenn.).

• **Emulsion Polishes:** New, 20-page booklet discusses properties, formulations and testing of emulsion polishes based on wax and polymers. Detailed charts present formulation data and performance test results. Section describes formulation variations that help achieve specific properties such as higher gloss, improved color, better water-spot resistance and improved handling. Schenectady Varnish Co., Inc. (Schenectady 1, N.Y.).

• **Fertilizer Stabilizer:** Three-hole-punched, eight-page brochure outlines use of colloidal attapulgite (clay mineral) in stabilizing liquid fertilizers. Also listed: basic properties, typical liquid fertilizer formulations containing it, necessary process equipment. Minerals & Chemicals Corp. of America (Menlo Park, N.J.).

• **Polyethylene Uses:** New, 20-page booklet describes over 100 applications for high-density polyethylene. Also included: chart of physical, electrical and chemical properties, list of future applications, and notes on design considerations. Polymer Chemicals Division, W. R. Grace & Co. (225 Allwood Road, Clifton, N.J.).

• **Glass Fiber:** New, 52-page booklet discusses production, properties and uses of staple-fiber and continuous-filament glass. Sections are devoted to comparisons with other textile fibers, fabrics and tapes, cordage and sewing thread and the fabrication of glass-fiber materials. Owens-Corning Fiberglas Corp. (Toledo 1, O.).

• **Microcrystalline Waxes:** Brochure presents story of microcrystalline waxes—what they are, how they are produced, company's production specifications and available shipping data. Bareco Wax Co., division of Petrolite Corp. (P.O. Box 390, Kilgore, Tex.).

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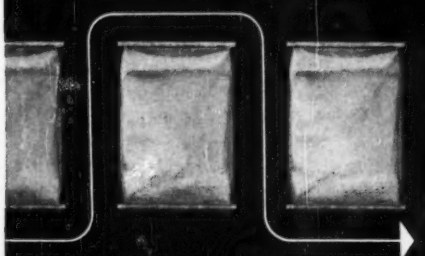

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Technology
Newsletter

CHEMICAL WEEK
July 2, 1960

A new semiconductor crystal-growing technique that's expected to hasten the arrival of miniaturized computers was unveiled last week at IBM's Poughkeepsie, N.Y., laboratories. It's a vapor-growth method—a kind of "atomic bricklaying"—which permits complex semiconductor materials to be deposited in one atomic layer at a time. Crystal growth is epitaxial, i.e., each successive layer deposited follows exactly the structure of the substrate crystal.

The basic principle of the vapor-growth process is the well-known Van Arkle iodide dissociation. Although it's a fairly common metallurgical technique, IBM's application marks the first time it has been used for semiconductor materials. The process works this way:

One version is carried out in a sealed tube containing a thin slice of monocrystalline substrate (e.g., germanium) at one end and the iodide of a doped semiconductor material (e.g., germanium containing gallium arsenide) at the other. By precise control of temperature at the two ends of the tube, two moles of diiodide, vaporized from the doped material, dissociate into one mole of tetraiodide and one mole of the semiconductor material, which deposits on the base crystal. By adding a third zone charged with doped material of a different type, alternating layers of different electrical properties can be deposited. The process can also be carried out in an open tube, thereby affording even greater flexibility in the type and concentration of the doping agent used.

A major advantage of vapor growth: it's done at temperatures several hundred degrees below the melting point of the material. This minimizes pickup of undesirable impurities, also permits arbitrary spatial distribution of the elements used for doping. Conventional doping techniques rely on diffusion at close to the melting point, normally produce the highest concentration of dopant at the surface of the crystal. IBM's atomic bricklaying, on the other hand, can produce retrograde distribution (lowest concentration at the surface) because concentration of the dopant can be varied at will during the growth cycle.

Another possibility with the new process: the performance of operations—growth, doping and formation of junctions—in a single operation. And since the seed crystal can be placed in its final container, shaping and partial encapsulation of the finished device can be accomplished simultaneously.

To date, IBM has supported research in germanium vapor-growth on its own, has a parallel research program for silicon vapor-growth studies under way with Signal Corps support. Experimental production of Esaki tunnel diodes indicates that vapor growth is equal to—or better than—the conventional alloying or melt recrystallization methods used to form such complex solid-state devices. Even more important, it appears capable of providing good reproducibility on a mass-production basis.

Technology

Newsletter

(Continued)

A new fluorohalocarbon film developed by Allied Chemical features transparency and "virtually zero moisture absorption." It's called Aclar, is available in pilot-plant quantities; a large plant for making the resin is under construction at Allied's Baton Rouge, La., works. The new film is expected to cut the cost of packaging electronic and other delicate mechanical equipment components, as well as drugs, chemicals and other products. Item: Aclar Type 33 film provides a moisture barrier equal to polyester film 700 times as thick.

•

Advanced storable liquefied propellants may replace solid propellants for certain types of rockets, Allied Chemical's General Chemical Division President Frank French told newsmen in Washington this week. They'll also increase the range of many rocket types 20-50%, according to French, who bases his forecast on Allied's research on halogen fluorides, particularly chlorine trifluoride, as oxidizing agent, and hydrazine as fuel.

•

A new binder for interior latex paints has been introduced by Dow Chemical Co. Called Latex X-3339, the binder is reportedly made from a new and "radically different" type of styrene-butadiene polymer. The new latex does away with the need for protein thickener-stabilizer, uses instead methyl cellulose, which results in simplified formulations for paintmakers. Price: 32¢/lb. in tank-car lots, slightly higher than conventional styrene-butadiene latexes.

•

Industrial roofing at 20% lower cost than conventional multilayer built-up roofing is the aim of The Flintkote Co.'s (New York) new spray gun-application technique. The company has modified its Sealzit spray gun, used for resin spraying, for application of the more viscous asphaltic materials used in conventional roofing. This will permit savings in material costs over plastics now moving into the roofing business, offer the same spray-application economies of the plastics. A three-man crew can install 15-18,000 sq.ft./day of emulsion and chopped glass-fiber roving that make up the roofing, which Flintkote calls the Monoform Roof System.

•

Chemstrand is researching high-temperature polyamide fibers (melting point about 600 F) that might be used for tire cord (Du Pont-made HT-1 was reported last week: *CW Technology Newsletter, June 25*). Chemstrand eyes the military as the prime potential user, says that, so far, flex strength and toughness are major problems that haven't been overcome.

■

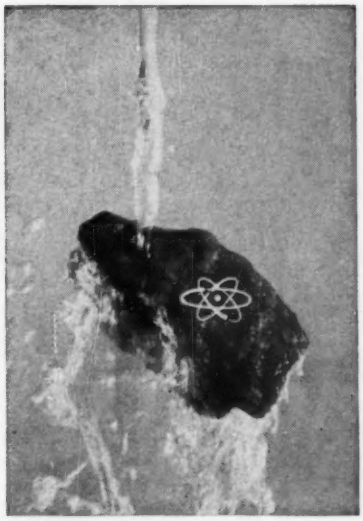
Five new dyes that cut acrylic fiber dyeing costs were put on colorful display by American Cyanamid's Dyes Dept. (Bound Brook, N.J.) this week. Feature: they do not need expensive retarding agents (e.g., quaternary ammonium compounds) for level dyeing, boast good penetration and fastness.

BRIEFS

oxalic acid
phosphoric anhydride
chlorine chemistry

WE GET FAN MAIL

Manufacturers are more likely to get complaints than compliments and, in most companies, are set up to handle them as delicately and expeditiously as possible. But no one seems to have a setup for the routine handling of complimentary letters. So, when customers write in to compliment us on the uniformity of particle size and quality of our oxalic acid, all we can do is be pleased about it. This at least affords an opportunity to stress the point that we take a lot of pains to keep sulfates low (to a typical 150 to 300 ppm). We make oxalic acid in two crystal sizes, numbers 2 and 3 fine, and as non-dusting as possible. It assays at 99.8% min. Ask for Data Sheet No. 789, covering properties and uses of oxalic acid.



P_2O_5 INVADES THE WORLD OF THE ATOM

There's a relatively new process being used to recover uranium oxide from crude ores. It substitutes solvent extraction for the older phosphate precipitation method and not only gets more uranium from the ore but does it more cheaply, permitting more automation, too. The solvent employed is dodecyl phosphoric acid made from Hooker phosphoric anhydride (pentoxide). Advantages for the new process include low first cost for solvent, re-use of solvent, low solubility of solvent in aqueous phase, high concentration ratio, low over-all chemical costs. Hooker P_2O_5 assays typically 98% minimum. Contaminants such as Fe, Pb and Cl are maintained at a 2 ppm max. Fluorine is no greater than 3 ppm. Arsenic is no higher than 50 ppm, and sulfate is completely absent. Write for Data Sheet No. 802.

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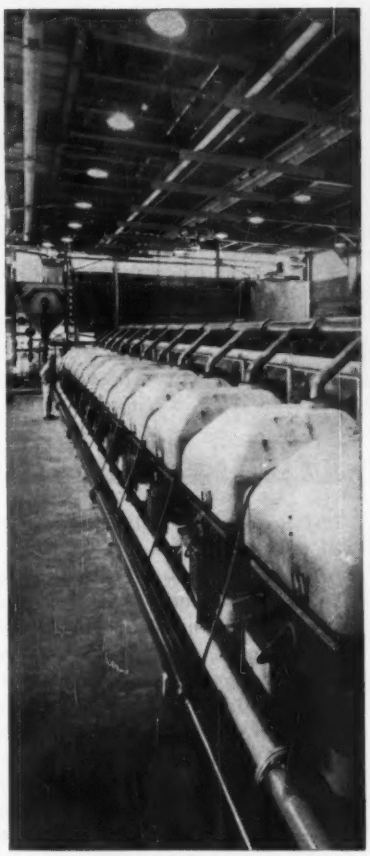

For more information, check here and mail with name, title and company address:

- ☐ Oxalic acid data sheet
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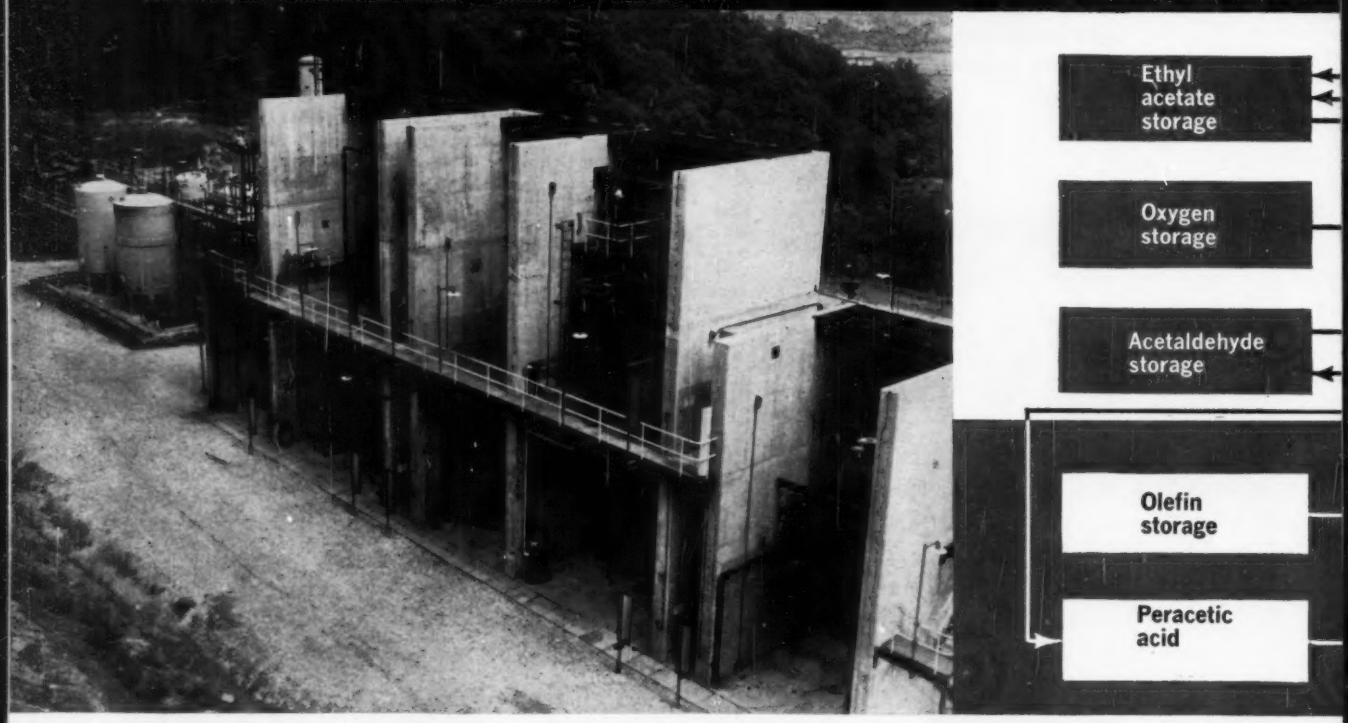
HOOKER CHEMICALS PLASTICS

Peracetic acid unit, designed for safety . . . opens new route to



Tamed Peracetic Acid Teams with Continuous

After some 10 months of commercial operation, Union Carbide Chemicals this week took the wraps off its 10-million-lbs./year peracetic acid plant at Institute, W. Va. A nearby versatile epoxidation unit is now turning out six new epoxy products (see p. 59), the first commercial members of a family of more than 800 epoxides produced by its pilot-plant predecessor (CW, April 14, '56, p. 92).

The peracetic acid unit itself is unusual. For one thing, it turns out a highly reactive, potentially hazardous product that can't be stored. And since the only by-product of the epoxidation is acetic acid (which UCC also makes by air oxidation of acetaldehyde for several other operations), net raw-material consumption consists only of olefins and the air or oxygen used. The acetaldehyde is, in effect, only "borrowed" for a short time by the peracetic acid unit on its way to becoming acetic acid for captive uses. Here's how the pieces fit together in the new epoxidation route:

Acetaldehyde and air (or oxygen) are fed to the first reaction stage together with a stream of ethyl acetate diluent. A small quantity of ozone is added to catalyze the oxidation of acetaldehyde to acetaldehyde monoperacetate (AMP). A gas purge is maintained to vent off inert gas and unreacted oxygen.

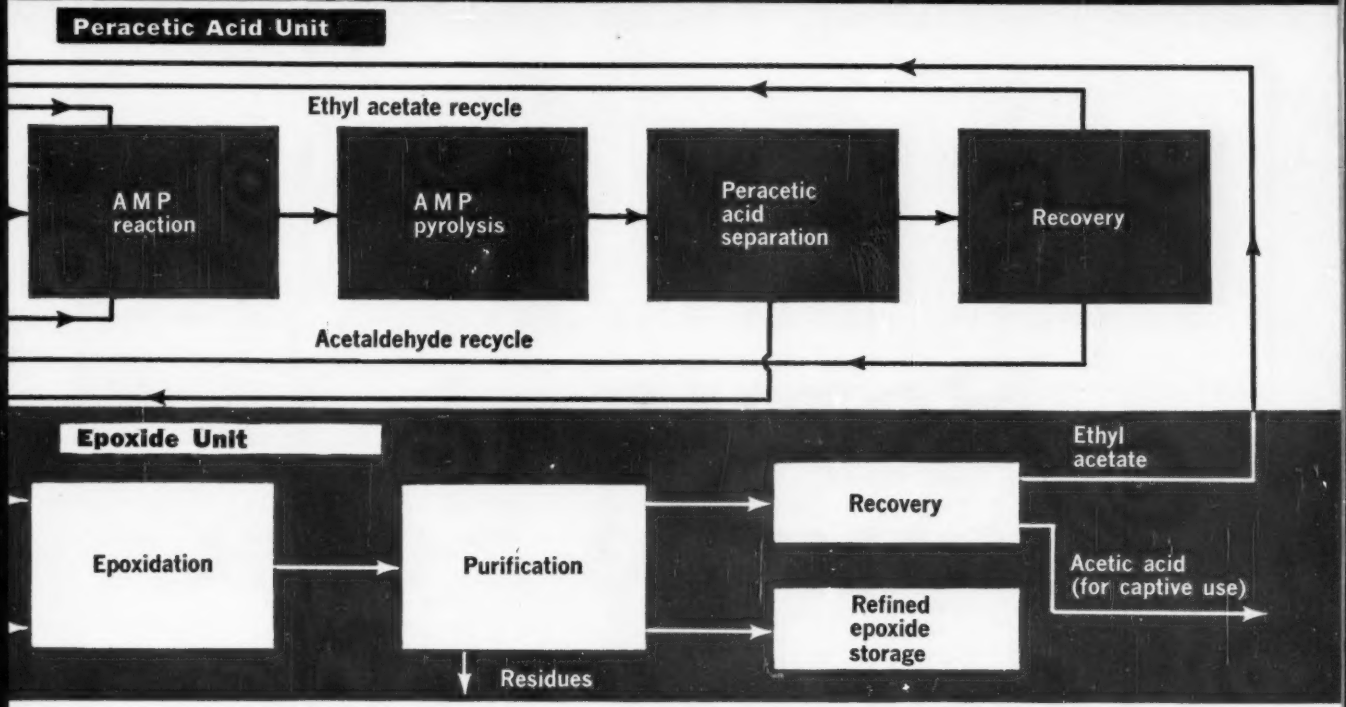
In the second stage of the reaction, monoperacetate is subjected to pyrolysis, which breaks it down into peracetic acid and acetaldehyde. The stream of mixed products is then fed to a separation system, which extracts refined peracetic as a 25% solution in ethyl acetate. The remaining acetaldehyde and the unused ethyl acetate pass on to a recovery system, are recycled to the feed end of the process.

The refined peracetic acid stream is piped to the epoxide unit, where it may react with a variety of unsaturated raw materials. The reaction places an epoxy linkage on the olefin to yield the desired mono- or diepoxide and acetic acid. The crude product stream is then transferred to a separation system, where refined epoxide is taken off as either a distilled or a residue product. A final recovery unit separates the ethyl acetate diluent for recycle to the peracetic acid unit, and by-product acetic for captive use.

Designed for Safety: Despite its sizable capacity and full-scale commercial operation, Carbide's peracetic acid unit bears all the earmarks of an oversize pilot plant. These are especially evident in the unique construction features dictated by safety considerations (*see picture, left above*) and in the processing flexibility built into the epoxidation unit.

The 10-million-lbs./year capacity, Assistant Plant Manager Bruce Burns points out, is large enough to permit efficient, profitable operation, but small enough to minimize the new investment required for a multipur-

le assortment of epoxides



Epoxidation Process, Taps Long Product List

pose facility. The current developmental operations, he adds, should lead to eventual construction of new peracetic acid and epoxide facilities with an annual capacity many times that of the present plant.

Chances are an eventual successor won't be merely a scale-up of the existing units. Reason: Carbide's peracetic production group, under supervisor Dan Santini, has learned enough about the tricky problems of handling AMP and peracetic to minimize some of the elaborate safety features built into the initial units.

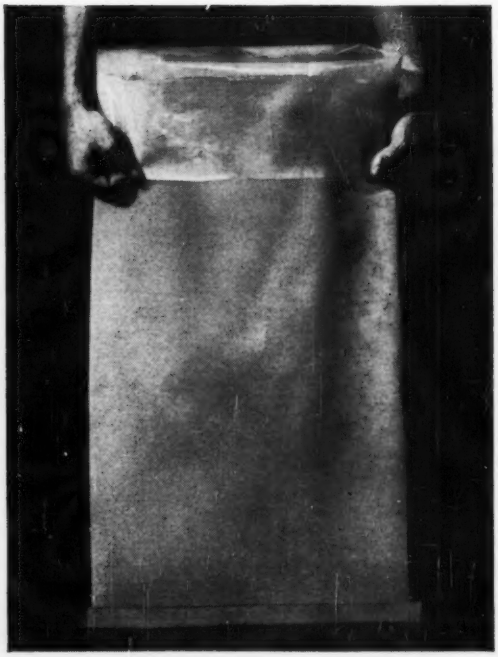
A primary factor in the design of the peracetic acid unit is the inherent instability of the products. AMP decomposes slowly below 0 C, is very unstable above 20 C. Below 40 C it decomposes into two moles of acetic with the evolution of large quantities of heat. Decomposition into one mole of peracetic plus one mole of acetaldehyde requires carefully controlled pyrolysis.

Peracetic normally decomposes slowly to yield acetic acid and oxygen, but it can be detonated under certain conditions in either the liquid or vapor phase. Therefore, the entire system had to be engineered to assure proper temperature control and meticulous exclusion of contaminants containing metallic ions, which catalyze the decomposition of both AMP and peracetic.

Because even the best conventional safety precautions couldn't guarantee meeting Carbide's safety standards, the plant was built on a remote hillside site. Modular process components were isolated from one another by placing each in a separate cell, roofed and walled on three sides with reinforced concrete. The open side of each cell faces the hill to permit the force of an accidental explosion to be spent harmlessly away from personnel and equipment areas. The operating control room and material-storage tanks are removed from the processing section and recessed into the hillside.

The peracetic acid solution flows by underground pipeline to the epoxide unit, and since it can't be stored, it must be cut off whenever the epoxidation process shuts down. To dispose of unstable products in the system when shutdown occurs, individual tanks and equipment can be emptied into a 30x50-ft., water-filled flare pond below the hill and ignited from the control room.

Under Control: With the tricky epoxidation process fast becoming a routine production job, it will soon be running with two production chemical engineers, plus two shift operators on the peracetic unit, three chemical engineers and two or three shift operators on the epoxide unit. The engineers will carry on process improvement, engineering studies, and economic analyses aimed at bringing more of the prolific epoxy brood into the commercial fold.



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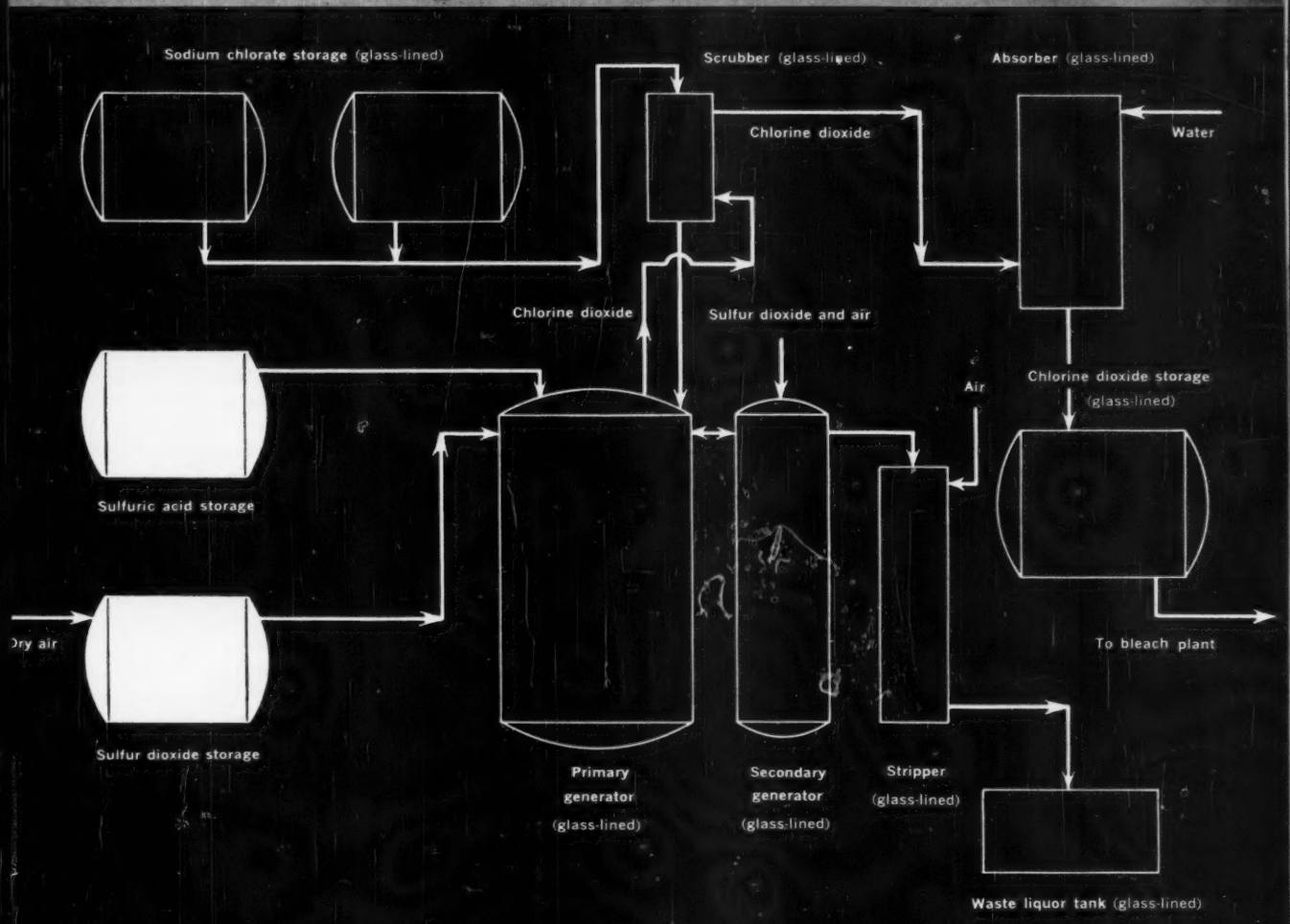


Glass-Lined Plants Step into Bleaching

The chlorine dioxide generating plant that the Fraser Companies Ltd. is starting up this week at Edmundston, N. B., Can., is only the second of about 60 in North America to use glass-lined equipment as extensively as shown above. But if it runs as smoothly as the first — at Gaspesia Sulphite's Chandler, Que., mill — pulp and paper makers as well as others in the chemical process industries are certain to give glass linings a closer look.

Glass-lined equipment has been used previously for parts of many systems for the highly corrosive chlorine dioxide. But until last fall, when the Gaspesia plant went onstream, no one was willing to pay the higher initial cost and gamble with the expense of glass linings for an entire system—a reluctance shared by many other processors.

So far Gaspesia's gamble is paying off handsomely. There have been no problems with the glass, and the plant has run for seven months with only three "puffs" — the pulpers' term for mild explosions that plague chlorine dioxide systems. In fact there were no puffs during plant startup, when they are most common — even when Gaspesia specifically tried to create them.

Some pulpers concede that Gaspesia's puff record is good, but attribute it more to good engineering design and operation than to use of glass-lined equipment. Maintenance of tight control over raw material is a key to eliminating puffs, they say. And complex instrumentation and highly skilled instrument maintenance — unfamiliar practices for some paper mills — can help keep operations smooth.

But elimination of the puff problem is still not fully understood. Puffs are unpredictable, also are thought to be caused by readily oxidizable foreign materials in the system that result in

chlorine dioxide decomposition. A piece of welding rod left in the system at startup, other metallic contamination, organic greases, etc., can cause puffs.

Urge to Improve: The Pfaudler Co., which engineered the Gaspesia job (also is engineering the one for Fraser), had the help of engineering experience from Gaspesia's parent, Anglo-Canadian Pulp and Paper Mills, Ltd. A-C's Dryden Paper chlorine dioxide plant had been a bad actor. Improper shape of the primary generator may have been part of that problem. But poor lead lining (the most commonly used lining material for generators) was probably a factor that contributed to puffs, spurred the decision to use glass at Gaspesia.

Pulpers agree that generators, when lead-lined properly, work well, may cost 10-15% less than glass. Although chlorine dioxide in water solution attacks lead, the concentrated sulfuric acid solution, in which the reaction takes place, forms a protective coating of lead sulfate on the metal. Olin Mathieson, which, along with Allied Chemical's Solvay Process Division, is a basic chlorine dioxide process licensor, has had a lead-lined generator in operation for 10 years without signs of corrosion.

Lead 'Burning' — Lost Art: However, some companies point out that lead "burning" (fabrication) is a dying art; in certain areas of the country, good lead burners, hence good lead linings, are difficult to get. In some sulfuric acid plants, for example, use of lead has been cut almost 75%—often by substituting plastics.

The dearth of top-notch lead burners still hasn't toppled lead from its perch as the more popular chlorine dioxide generator lining. Glass is the only other lining that has proved satisfactory, but builders still have some fears about it.

"We would have to learn how to live with glass—and this takes time," says one pulp mill manager. "As long as we don't have trouble with lead there is no reason to risk a change."

The process of learning to live with glass isn't always easy, may be partly responsible for its reputation. A plant manager cites this case: "We dropped a glass-lined vessel while setting it into place. To our surprise, the lining didn't fracture. But a few years later the lining failed without warning —and we still haven't been able to figure out why."

Young in Years: Another reason why pulpers shy from using glassed-steel may be its late start. The first use of glassed-steel in chlorine dioxide service was for a storage tank in '55. The first large generator went into service about two years ago.

The first modern chlorine dioxide plant in this country was put onstream about 10 years ago by Olin Mathieson at Niagara Falls, replaced an older lime-kiln process. But OM didn't offer its process to others on a royalty-free basis until later — the first plants went up in '54.

Solvay was the first to offer a process in this country on a royalty-free basis. It developed its process for the pulp and paper industry, doesn't operate a plant of its own. The first commercial Solvay process plant was built in '52.

In both processes, the chlorine dioxide is generated by the reduction of sodium chlorate in a sulfuric acid solution. The major difference between processes: the Solvay uses methanol as the reducing agent; the Mathieson uses sulfur dioxide.

In the Mathieson process (*see diagram, p. 47*), sodium chlorate, sulfuric acid and a mixture of sulfur dioxide and air are fed continuously to a primary generator, jacketed to maintain a cooling temperature of 90-100 F. Partly reacted liquor overflows into a secondary generator, where sulfur dioxide is added to complete the reaction. The chlorine dioxide passes back through the primary generator, then through a scrubber to reduce free chlorine. The chlorine dioxide is then absorbed by water in a packed column.

The waste liquor (sodium bisulfate in acid solution) from the generator is purged of chlorine dioxide by air in a packed column.

In the Solvay process, the generator temperature is maintained at 135-145 F. As in the Mathieson process, overflow from Solvay's first reactor feeds a second reactor, where additional methanol is added. Air is used to strip the chlorine dioxide from the liquor in the two reactors, carries it to a porcelain-packed absorption tower, where it is absorbed in water.

Glassed-steel is now competing with tile and stoneware for the towers and columns in both processes. Stoneware, about 20-25% cheaper than glassed-steel, is considerably more fragile. Puffs are sometimes violent enough to cause damage, have caused a tower to collapse.

Tile requires a membrane, such as polyvinyl chloride, between it and the steel shell, which may give glass an economic edge. But some companies prefer to work with tile, say it is easier to patch. For example, Buckeye Cellulose, which has just finished doubling capacity of its plant, added 10 ft. to its tower by lining the steel section with membrane and tile at the job site before hoisting it into place.

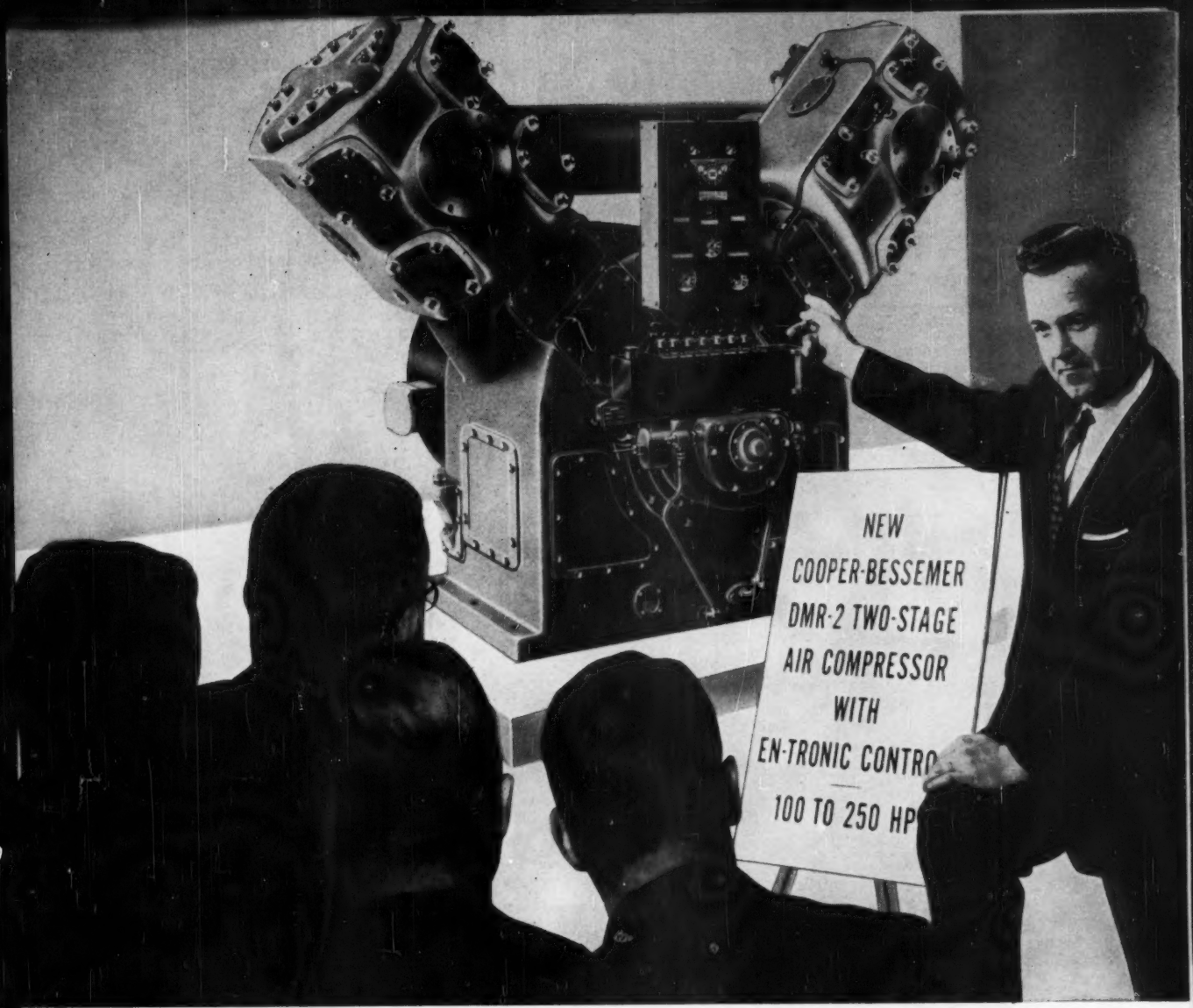
Buckeye, which is said to have installed the first glass-lined storage tank used for chlorine dioxide, added another glass-lined tank, but picked lead lining for its new generator. It is also trying glass fiber-reinforced polyester piping, which, because of separation, hasn't always met with success at other plants. Some pulpers are using polyvinyl chloride piping, others saran-lined and Pyrex. Pfaudler's new glass-lined piping that can be field-cut may help it gain wider usage because of lower cost than standard glass-lined piping.

Process Breakeven: Just as there seems to be no clear-cut advantage for one material of construction over another, neither chlorine dioxide generating process has gained an advantage over the other.

Both OM and Solvay have more than 20 licensed plants in operation in this country. OM has an additional 13 plants licensed in Canada, 10 others throughout the world. Solvay hasn't shown interest in licensing outside the U.S., doesn't even hold foreign patents on its process.

If sulfur dioxide is generated at the process site, the Mathieson process may have an economic edge. But Solvay claims an edge if liquid sulfur dioxide must be brought in—an edge not held in Canada, where methanol is a high-cost item. The use of sulfur dioxide would appear to make the Mathieson process more attractive to sulfite mills—but Solvay points out that at least three sulfite mills are now using its process.

Both all-glassed steel plants are Mathieson type. But if the Fraser startup is as puffless as the one at Gaspesia, it is likely to boost the stock of glass-lined equipment, regardless of plant process.



Dann Goodson, *Manager Motor-Driven Compressor Sales,*
The Cooper-Bessemer Corporation, explains...

How Cooper-Bessemer's new, compact Air Compressors simplify installation and reduce costs

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JEFFERSON CHEMICALS

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Market Newsletter

CHEMICAL WEEK
July 2, 1960

Polyethylene film capacity continues to expand as two more new plants go into operation in an already crowded field.

This week the first commercial shipments of Du Pont's new polyethylene packaging film, designed specifically for bag making, rolled out of the firm's just-completed plant at Richmond, Va. (Startup began the last week of May.) When in full operation the plant will be able to turn out more than 30 million lbs./year of film in widths up to 44 in., thicknesses of 1, 1¼, 1½ and 2 mils. Output will go to consumer packaging outlets. Raw materials will be supplied from Du Pont's Sabine Works at Orange, Tex.

Du Pont also operates a polyethylene film plant at Buffalo, N. Y., producing for agricultural and industrial markets. Output potential of this operation is being expanded.

By early '61 Du Pont's polyethylene film capacity from these two facilities, as well as the potential of a pilot-plant operation at Orange, will be more than 50 million lbs./year.

The Orange pilot operation is no longer producing polyethylene for commercial outlets, but could be used if necessary.

Also starting commercial production of polyethylene film is Turex Plastics, a wholly owned subsidiary of Rexall Drug and Chemical Co. The Turex plant is located near Nasonville, R. I., has a planned capacity of about 10 million lbs./year. Output is aimed at packaging materials for food products and textiles, as well as industrial uses. Besides polyethylene, the plant will also be able to turn out polypropylene films.

•

Liquid chemicals in bulk may soon move into the Boston area by deepwater tanker. A new bulk-liquid chemical terminal is now going up at Beverly, Mass. (10 miles north of Boston) on the former site of a Gulf Oil Corp. terminal. It's the East Coast's first bulk-liquid chemical terminal on deep water north of New Haven, Conn.

The terminal will be operated by Beverly Chemical Terminal Co., newly formed joint venture of two chemical distributors— Boston's Truesdale Co. and Agrichem Corp. (Jacksonville, Fla.).

Agrichem and Truesdale are betting that the new terminal will attract bulk shipments via water that can be broken down into smaller lots to supply New England's growing number of widely scattered small-volume users of chemicals.

Chemicals likely to move to New England markets via the new terminal: caustic soda, styrene monomer, methanol, other solvents, ethylene glycol and various oils for the paint industry.

Market Newsletter

(Continued)

A new threat to cellulose acetate cigarette filters may be shaping up. Brown & Williamson Tobacco Corp. has introduced on a nationwide scale, a new brand of cigarettes using an all-tobacco filter. The cigarettes, which will be marketed under the name "Kentucky Kings," have filters made entirely of finely cut tobacco and will require about 25% more burley tobacco than cigarettes with artificial filters. Cigarette filters now consume about 20-23,000 short tons/year of cellulose acetate.

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Expansion of chlorine dioxide facilities has been completed at Buckeye Cellulose Corp.'s Foley, Fla., operations. Output potential of Buckeye's chlorine dioxide generating unit has been doubled from 3 to 6 tons/day (*see pp. 47-48*).

Reason behind the move: the continued trend toward increasingly brighter kraft and dissolving pulps (chemical cellulose) (*CW Cellulose Report, Aug. 29, '59, p. 54*).

Buckeye is now increasing capacity for bleached kraft and dissolving pulp at its Florida site. This will add 33,000 tons/year to capacity —13% above the present 260,000-tons/year output potential for these products.

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Look for the West Coast's first liquid hydrogen unit to go into operation during the next month. Linde Co., division of Union Carbide, is now nearing completion of its 6.5-tons/day plant at Torrance, Calif. Output from the unit will go mainly into missile and rocket applications.

•

Manganese production capacity has been increased 20% by Union Carbide Metals Co., division of Union Carbide Corp. Expansion was accomplished by installation of additional cells at the company's Marietta, O., plant.

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More "super-jumbo," 30,000-gal.-capacity tank cars are going into chemical service. Esso Standard, division of Humble Oil & Refining Co., will lease 12 of the sausage-shaped cars, made by Union Tank Car Co. (Chicago) for hauling ethyl ether from its Baton Rouge, La., refinery.

The first two of the big cars were leased by Tuloma Gas Products Co. (Tulsa, Okla.) for shipping liquefied petroleum gas. The cars are 85 ft. long, and limited to carrying products with densities under 8.36 lbs./gal.

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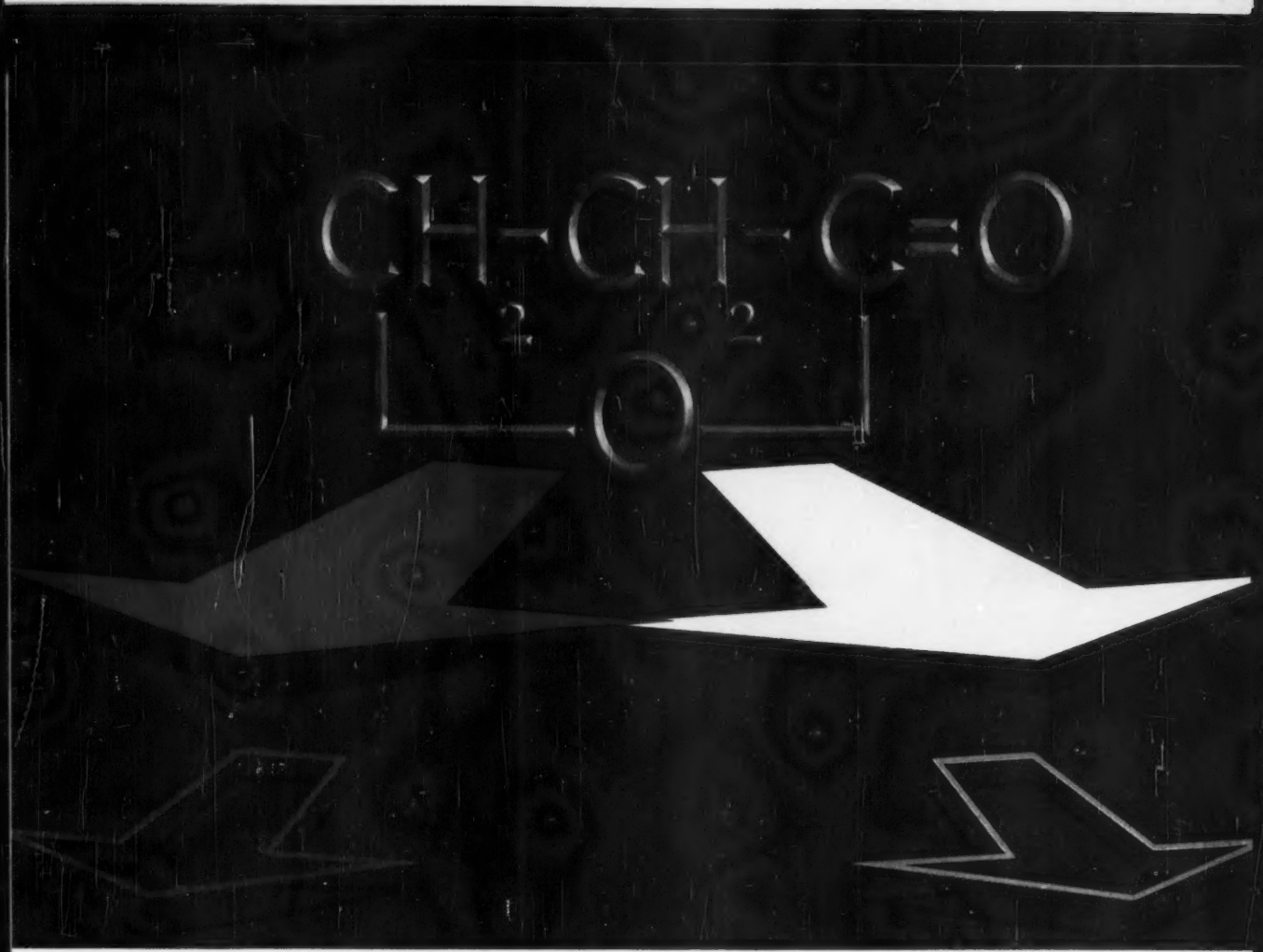
Prices of phthalic anhydride will be boosted 2¢/lb. by Reichhold, effective this week. Reichhold's price: 23¢/lb.



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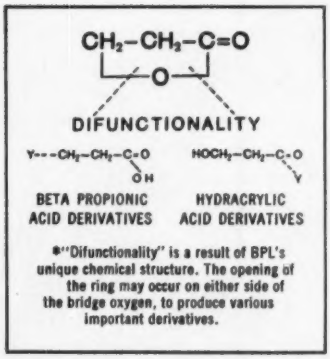

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Fireworks: No Boom

Next week U.S. citizens will commemorate the signing of the Declaration of Independence by lighting up the sky. About $9.6 million (retail) will go up in a flash of Fourth of July pyrotechnics such as screaming meemies, Roman candles and flying Dutchmen. Many of the noise- and light-makers will be set off by do-it-yourselfers, but—unlike a generation ago—a larger share will be touched off by professional pyrotechnicians for clubs, civic groups and other large spectator gatherings.

Firework sales—though dealt heavy blows by federal and state legislation—still represent a tidy business in the U.S. About $16 million is spent annually in the U.S. for fireworks; $12.5-13 million for products made here, the rest for imports. For the U.S. chemical industry the millions spent for domestically produced fireworks represents a $1.3-million raw-materials bill.

An Ancient Craft: Although no one knows for certain when the first fireworks came into use, it is believed that the Chinese were featuring them at religious ceremonies and holidays in the 13th or 14th centuries. In the 16th century they were used in Italy at the crowning of the popes.

Some historians believe that fireworks were brought to the U.S. by the English colonists of Jamestown. The signing of the Declaration of Independence, however, gave the settlers their first big occasion to celebrate, established fireworks as a firm tradition.

Today about 50 companies manufacture fireworks. Ninety percent of the business, though, is done by five major companies: United Fireworks Mfg. Co., Inc. (Dayton), M. Backes' Sons, Inc. (Wallingford, Conn.), Keystone Fireworks Manufacturing Co., Inc. (Dunbar, Pa.), New Jersey Fireworks Manufacturing Co., Inc. (Elkton, Md.), and Tri-State Manufacturing Co., Inc.

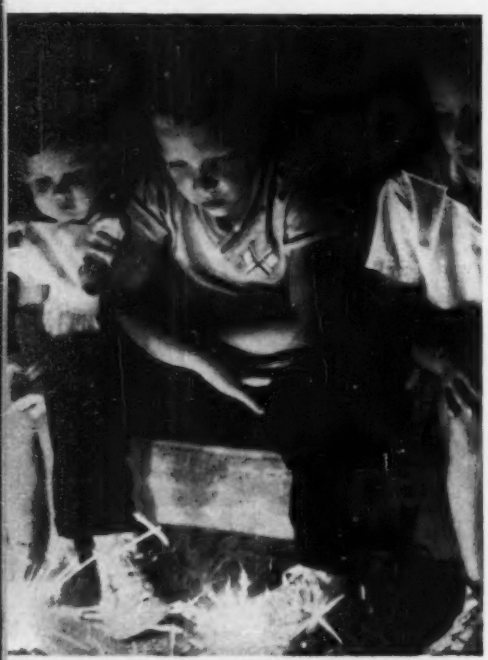
(Loveland, O.). United does about 40% of the total business.

Although there are probably more fireworks makers now than at any previous time, the increase has been among the smaller producers. The mortality rate of big companies has been heavy, mirroring the languishing state of the industry. (One of the more famous fireworks companies, Unexcelled Chemical Co., gave up the line in 1951.)

The Comic Book Trade: The fireworks business has been rolling downhill since World War I. Two reasons: restrictive legislation by state and federal governments and growing competition from abroad, especially Japan.

All states except North Carolina permit the manufacture of fireworks, but only four allow unrestricted sale and use. Sixteen states allow open sale of the less dangerous fireworks—sparklers, caps and "snakes," while display fireworks are legal in every state on a permit basis.

Most recent industry setback was in '53, when a federal law was enacted prohibiting shipments of fireworks into states where their use was banned. Prior to that time, fireworks companies, with the aid of children, were doing a thriving business by mailing fireworks to consumers in states where they were illegal. Mail orders were procured by advertising in comic books and by direct-mail solicitation.



Million sparklers help hail the Fourth.

Outsiders Getting In: Some 30-35% of the fireworks exploded this Fourth will be Oriental-made. The retail value of all foreign imports is $3-3.5 million/year; factory value, $1.7 million.

Major sources: Japan, 43%; Hong Kong, 23%; the Portuguese colony of Macao, 30%. Low price is the reason for their popularity. Much hand labor is involved in making fireworks, and Oriental countries, with low labor costs, can handily compete.

The 100 or so wholesalers and jobbers who distribute fireworks do not appear to have any special partiality to U.S. producers—all import and supply foreign fireworks.

Rocket's Red Glare: Pyrotechnic chemicals are supplied mainly by a few companies. Hummel Chemical Co. (New York) supplies about two-thirds of the raw materials for this industry. A large gunpowder supplier is Du Pont (Wilmington, Del.). Other companies in fireworks chemicals include Croton Chemical Co. (New York), Foote Mineral Co. (Philadelphia), and Metals Disintegrating Co. (Elizabethtown, N.J.).

Biggest manufacturer, United—it has annual sales of $2 million—figures it spends $500,000/year for chemicals. The company uses 50,000 lbs. of barium nitrate (main ingredient in sparklers) each month, plus large tonnages of potassium nitrate, red gum, barium chlorate, strontium nitrate.

Specific chemicals are used to produce specific sound and color effects. For example, barium chlorate gives green; sodium carbonate, yellow; strontium nitrate, red.

Pyrotechnics formulations have undergone only minor improvements over the years; few basic changes have been made in half a century.

Although formulas vary widely, depending on the desired sound or color, a typical formulation for a basic red explosion might use a strontium nitrate base, plus potassium perchlorate, sulfur, red gum, and stearic acid.

Backes' Sons, which makes paper caps, uses a mixture of potassium chlorate, ammonium sulfate, red phosphorus, magnesium carbonate, gum and water. (The company's big customers: TV westerns.)

How They're Made: The manufacture of fireworks is a precarious and dangerous operation. To cut down the damage in case of an explosion, most of the compounding of chemicals is done in small, flimsy shacks—about the size of a chicken house—with one or two men working in each.

In making rockets, the chemical ingredients are mixed like bread, compressed and dried, then cut into pellets called stars. The stars are encased in rolled sheets of paper, a booster such as black powder is added, then a timer is attached to make sure the rocket won't go off until it has soared a safe, high distance.

United is one of the few producers that have gone in for mass production. For example, it built its own machine to produce 25 million paper caps daily.

Little Boys' Delight: Publicly purchasable fireworks, like sparklers, salutes, fountains and cones, are bought and used mainly by children. On the average Fourth, 1 million sparklers are used; also, 65 million snakes, 43 million tube salutes and cherry bombs, and 750,000 gross of paper caps.

In a "wet" state, an 8-in. sparkler legally sells for 10¢; in a "dry" state the price might get up to 25¢. The costliest fireworks ordinarily sold to the public is a $3 aerial bomb.

Display fireworks are sold to municipalities, clubs and other organizations, and are set off by permit. In addition to openings of county fairs and shopping centers, many retail businesses sponsor public exhibitions. For example, Macy's (New York) held its third annual fireworks display this week, shooting kaleidoscopes of color over Manhattan from a barge on the Hudson River. The products used were Japanese imports.

For the 11th year, the F&M Schaefer Brewing Co. (New York) will sponsor 10 displays this summer at Coney Island. The beer company purchases its fireworks from Interstate Fireworks Co. (Bridgewater, Mass.), which makes displays only. Interstate estimates that an average show might cost $2,000 for fireworks alone, and perhaps a total of $5,000 when all costs are figured (advertising, a barge, technical men to set off the display).

In Chicago a new outlet for fireworks is the colorful new White Sox scoreboard. When a home team player hits a homer (a rare event this year), the scoreboard lights up, sirens scream

and Roman candles send up balls of fire. Miffed by the scoreboard's partisan attitude, the New York Yankees recently came tumbling out of their dugout, sparklers in hand, when one of their teammates got a circuit clout.

Spectacular Business: The fireworks business is one in which $16 million in retail sales for the entire year is rung up in about a 10-day period.

About 60% of fireworks sales are made between June 28 and July 4. The rest are sold in the Southern states at Christmastime and New Year's.

Texans, who treat bans lightly, are big users of fireworks for all sorts of celebrations. Keystone says it sells more fireworks to the second-biggest state than to any other.

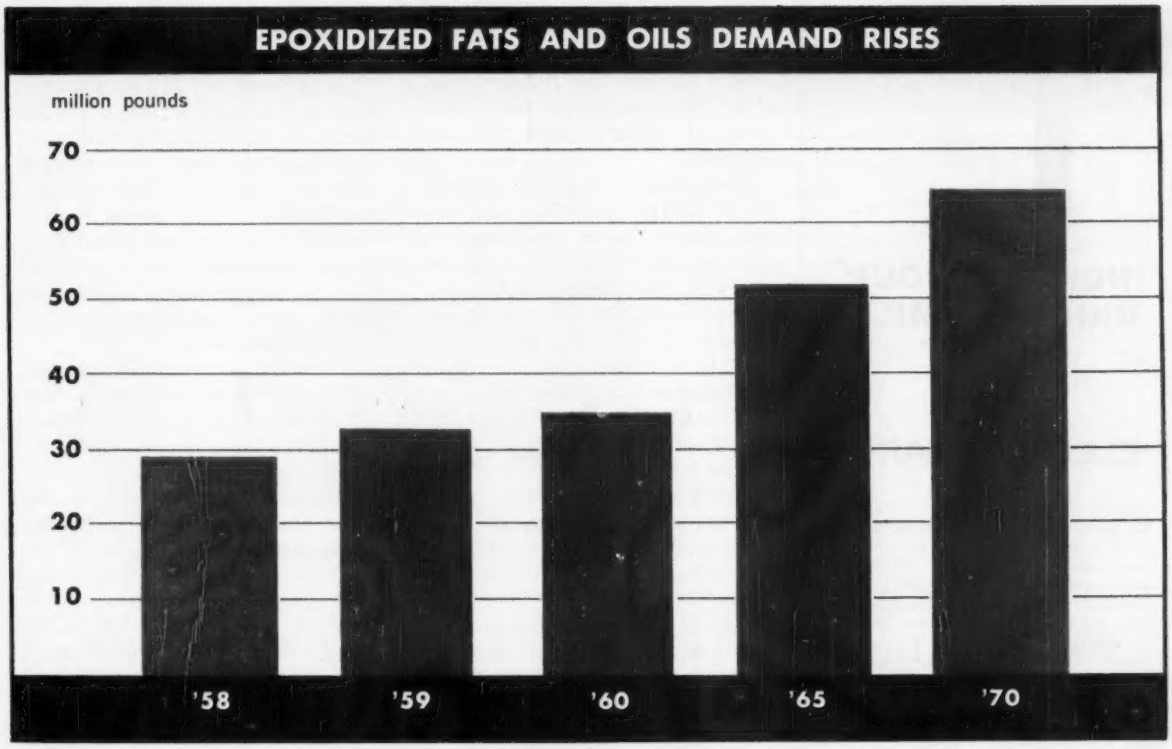
Normal paths of distribution in this field are from manufacturer to wholesale distributor to retailer to consumer. The wholesaler's average markup is 35%; the retailer's, 50%. Manufacturers point out that sometimes their profits are as low as 5%.

The Razzle-Dazzle Dims: Many companies in this field are family operations, and have been in business many generations. They can remember the good old days when fortunes were made in fireworks.

C. B. Backes, who heads a four-generation company in business since 1876 and who has been in the business himself 40 years, says philosophically but with a tinge of bitterness, "The trouble with this industry is state sovereignty." When one of Backes' main buildings burned a few years ago the company didn't replace it.

Another family affair is Keystone. President Badey Lizza, who comes from a long line of Italian fireworks makers, started the company in 1912. Today he says, "It's a terrible business to be in," and advises his four sons to make their living in a more stable field. (They haven't taken his advice.)

Though there's ample justification for taking fireworks out of the hands of youngsters and putting them into the hands of professionals, it's becoming apparent that as a spectator sport, fireworks are something of a fizzle. Watching Niagara Falls cascading in multicolored profusion just doesn't have the same kick, for most people, as watching a tin can sent flying by a "two-incher." For this reason—and imports are another—fireworks as a U.S. industry seem destined to go out not with a bang but with a whimper.



Epoxidation, Peracetic Acid Grow Together

Union Carbide Chemicals Co. this week is offering six new commercial chemicals, all derivatives of its peracetic operations at Institute, W. Va. (also see p. 44). Three of these compounds are epoxidized fats and oils, which points up how peracetic's welfare depends in part on the growing markets for modified fatty products. The other three newcomers are epoxy resin formers, which reflects Carbide's efforts to broaden outlets for peracetic acid.

Carbide is betting that, even without help from novel markets, plastics makers' increasing calls for epoxidized fatty materials will assure a steadily mounting demand for peracetic.

Warren Frissell, Carbide's technical service supervisor for these products, points out that epoxy plasticizers find widest use in vinyl products. They give heat- and light-stability to vinyls used in sheeting film, extrusions, wire coatings and auto fabrics.

Almost all of the '59 output of epoxidized materials (32 million of the total 33-34 million lbs.) went into vinyls and a 10-11% growth is expected this year.

Of the epoxidized fats and oils market, epoxidized soybean oil has the largest share—about 21 million lbs. in '59. This year modified soya production is expected to increase 12%, to 23.5 million lbs. And growing uses of vinyls will push demand for these plasticizers to near 35 million lbs. by '65. In 10 years the market is expected to swell to about 44 million lbs./year.

A smaller outlet for peracetic-treated materials—but also growing fast—is the epoxy ester market. This material's widest application is also as a plasticizer for vinyls. The estimated 11-million-lbs. output of epoxy esters in '59 was a little more than half that of epoxidized soy bean oil products. During '60 demand will increase about 10%, to roughly 12 million lbs. And continued growth is foreseen during this decade: to about 17 million lbs./year by '65, and to around 21 million lbs./year by '70.

Cellulosics Secondary: A second outlet for the epoxidized products is as a plasticizer for nitrocellulose coatings. This is still a small market—less than 2 million lbs. in '59. Some growth is foreseen, but it's not expected to become a major outlet.

Some miscellaneous applications of epoxidized materials include use as an acid-accepting stabilizer in chlorinated solvents and as a plasticizer for rubber. Other developments now under study are applications in surface coatings and possibilities of using it as a reactive diluent for standard epoxy resins (epichlorohydrin-bisphenol A types).

Of Carbide's six new products out this week, the three epoxy resin-forming materials (Epoxide 201, 206 and 207) will compete in markets held by epichlorohydrin-bisphenol A resins.

Many Competitors: Carbide will not have the most important field for peracetic derivatives to itself, however. About 18 chemical manufacturers are now turning out this epoxy type of plasticizer; virtually every major plasticizer maker includes epoxy

MARKETS

plasticizers in its line of products.

Carbide's biggest competitor is Rohm & Haas, which has been making these products at its Philadelphia plant. Other important competitors include Archer-Daniels-Midland, Argus Chemical, Baker Castor Oil and Reichhold.

Direct Route: But Carbide has several advantages in its favor. One is its new process. All of its competitors carry out the epoxidation of fats and oil by *in situ* reaction of hydrogen peroxide, acetic acid, catalyst and the soybean oil or fatty ester. Its new peracetic unit, with 10-million-lbs./-year capacity, is alongside the more-than-10-million-lbs./year epoxidation unit. (Carbide is not selling the highly reactive hard-to-store acid; it will use all output captively.)

Moreover, Carbide has an established sales force for the plasticizers (Union Carbide Chemicals Co.'s sales force).

This is a definite advantage for a newcomer, since the cost of setting up a sales force would cut deep into profits. The present sales force, covering the entire country, gives Carbide national coverage at minimum cost. And selling expenses will be shared with the dozens of other chemicals in the firm's product line.

Of the three derivatives being offered by Carbide for the epoxidized fats and oils market, two are epoxidized soybean oil types (Flexol EPO and JPO); the other is an epoxy ester type (Flexol EP-8). Carbide's Ed Lines, who has been handling development of these materials, says a fourth product, an epoxidized phthalate ester type (Flexol 163-D), will be commercialized later this summer.

Using peracetic acid as a starting material, Carbide has synthesized about 800 chemical compounds, but it will concentrate on six for the time being. Many other derivatives, however, are being field tested, and some of these products will likely become commercialized during this year.

And, of course, it is still early to assess the effect of Carbide's peracetic derivatives on the epoxidized fats and oils market. Most of the current producers have sizable capital investments in producing facilities for these materials and are in a position to meet any competition. For them, Carbide is "another competitor in a fast growing, crowded market."

MARKETPLACE

Rare-Earth Use Down: Apparent consumption of rare-earth elements in '59 is estimated at 1,500 short tons of rare-earth oxides, according to the Bureau of Mines' mineral market report issued last week. This is about 1,000 s.t. below apparent consumption estimated by the bureau in '58.

Uses for the rare-earth elements remained essentially the same as in '58, with the largest volume going into metals, alloys, glassmaking, and electrodes for arc-lighting.

At the same time imports of cerium metal, ferrocerium and other cerium alloys increased to 16,511 lbs., valued at $59,898. This was almost 5,000 lbs. over imports in '58.

Exports of cerium ores, metals, alloys and ferrocerium (including lighter flints) were also higher in '59. Total exports were 40,843 lbs., valued at $67,238. In '58 exports were only 29,998 lbs., valued at $23,717.

Domestic mine shipments of rare-earth oxides in '59 were about the same as last year's.

•

Thorium Plateau? U.S. consumption of thorium continued rapid growth in '59, although the outlook for '60 is for a leveling off in demand.

According to the latest Bureau of Mines' mineral market report, consumption of thorium (as ThO_2) increased 11% in '59, to 192,000 lbs. In '58 consumption was up almost 20% over '57. But the bureau says thorium applications in '60 are expected to remain at about the '59 level.

Chief uses of the metal continue to be in magnesium-thorium alloys and in gas mantles. Thorium is also used in chemical reagents, refractories, electrical equipment and sand castings.

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Wood treated with preservatives hit a 25-year low in volume in '59, mainly because of a 31% decrease n the amount of crossties treated, according to the U.S. Dept. of Agriculture. A total of 206.6 million cu. ft. of wood were treated in '59, 11% less than in '58 (232.8 million cu.ft.). About 15.6 million crossties were treated in '59, compared with 22.8 million in '58. Volume of poles and crossties treated increased 3%, but there was a drop in the use of preservatives for other products.

More antitrust problems ahead for the CPI? Maybe. State, county and municipal governments—abetted by Washington—are stepping up their antitrust campaigns. Already, New York and California have accelerated "trust-busting" activities, and other states may follow U.S. Attorney General Rogers' advice to "take vigorous antitrust enforcement action." But the chemical industry is not worried. It is apparently keeping well within the laws.

Local Antitrust Actions: No Problem Yet

Chemical processors doing business with state and local governments, particularly in New York, California and Texas, can look for antitrust skirmishes to multiply. But few expect all-out antitrust warfare to result from current flare-ups.

Most recent evidence of activity was last month's avowal by California's Attorney General Stanley Mosk to step up antitrust investigations and litigation. And a CHEMICAL WEEK survey last week indicates that states in the northeastern U.S. and Texas also will take action.

Moves against CPI companies are largely limited to complaints on pricing and sale of such bulk commodities as chlorine, calcium chloride, bituminous road products, and the like. The charges are usually price fixing and conspiracy in restraint of trade.

Underlying Reasons: Although few industry representatives see a trend to intensive, widespread antitrust action, most of them report an awareness of more local activity than usual. They think this increase stems from three factors representing political forces, cyclical forces and federal pressure.

In an election year, some observers contend, many more cases are aired so that state and local governments can show the taxpayers "something for their money." Others, including federal officials, say that antitrust cases come and go in cycles, that a period of generally accelerated action is beginning.

Still others trace new moves to last March's Conference on Consumer and Investor Protection, held for all state attorney generals in Washington, D.C. At that conference U.S. Attorney General William P. Rogers promised to give federal assistance to state fights against nonfederal antitrust violators.

Cases in Point: Recent actions indicate areas of state interest. In Boston the Bituminous Concrete Assn., Inc., and 17 companies that make and sell bituminous concrete, road tar, and asphalt were found guilty of price fixing in a criminal antitrust suit filed in April (*CW, April 30, p. 48*) and were fined $465,000. A civil antitrust suit will be heard in the fall. Possible outcome of that could include orders to devise new price lists showing profit markups, and certification that prices were arrived at individually and that bids were unilateral.

Other areas:

- *Maine.* In an action similar to the Massachusetts case an antitrust suit will be filed soon against bituminous concrete manufacturers and suppliers, asking for relief from price fixing, territory and customer allocation, and bid rigging. State Attorney General Frank Hancock said he will bring a civil action to recover treble damages—possibly as much as $1 million — from the six companies found guilty in an earlier criminal suit brought by the federal government.
- *Wisconsin.* The state is following up a federal investigation of calcium chloride price fixing and identical bidding (*CW, March 5, p. 46*).
- *Texas.* Unlike many states, Texas has strong antitrust laws and does not rely greatly on federal assistance. Six chemical companies last year paid a $75,000 penalty for "conspiring to fix and maintain" the price of liquid chlorine. Current activity there is centered on the oil companies.
- *California.* With only a few cases now in court—none of them in the chemical industry—California currently is more involved in investigation than in litigation. Attorney General Mosk's staff is "investigating industry as a whole," including the CPI, according to his antitrust unit. Individual company investigations are under way now. William Dixon, of the attorney general's office, has organized a program of antitrust law enforcement. He says that most of the suits to be filed will be "to seek relief in the public interest rather than in suits for damages."

Dixon declined to name specific cases under investigation. Assistant Attorney General Wallace Howland, head of the antitrust unit, said the primary objective of the program "is to ensure that state and other public agencies obtain the full benefits of competition in the purchase of supplies."

- *New York.* Probes on price fixing of both chlorine and anhydrous ammonia are active. The outcome of these has not yet been made public.

State Attorney General Louis Lefkowitz told CHEMICAL WEEK, "On my recommendation, the state legislature passed a bill that makes conspiracy for the purpose of bidding a misdemeanor. Where proved, such practices can't be tolerated, and strict and impartial application of the antitrust laws is necessary."

Solution Search: Most chemical industry lawyers see no solution of

what they call "a teeter-totter situation":—"If you underbid, you're accused of starting a price war; if you quote identical prices and sell service, quality and timing, you're accused of collusion." Government attorneys are well aware of this problem, but, as one summed up, "Industry practices can be wrong. Our concern is to find where collusion exists."

Arbitration Clarified

The U.S. Supreme Court last week issued three rulings that help spell out the role of federal courts in relation to labor arbitration. The decisions serve to notify management that for the most part arbitrators' decisions are final and that great care should be taken to specify what can be arbitrated and what cannot.

In sum the three decisions clarify two points:

- Federal courts must enforce an arbitrator's award even if they don't agree with his interpretation of the case. Said the court, "It was the arbitrator's construction which was bargained for; and so far as the arbitrator's decision concerns construction of the contract, the courts have no business overruling him because their interpretation of the contract is different from his."
- Federal courts may refuse to compel arbitration only on the assurance that: (1) the contract does not cover the dispute or can't be interpreted as covering it; (2) the contract explicitly exempts a matter from arbitration.

One case, involving the American Manufacturing Co. (Chattanooga), was over a contract clause that called for arbitration of all disputes between labor and management "as to the meaning, interpretation and application of the provisions of this agreement." A lower court said that the issue subjected to arbitration was frivolous, but the Supreme Court ruled that "the agreement was to submit all grievances to arbitration, not merely those the court will deem meritorious."

Another case, with the Warrior and Gulf Navigation Co., was over a clause that excluded from arbitration "matters that are strictly a function of management." A lower court ruled that the substance of the dispute was not subject to arbitration under the contract. The Supreme Court ruled

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London E.C. 4...E. E. Schirmer, N. Murphy, McGraw-Hill House, 95 Farringdon St., England.

Los Angeles 17.....Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36.....Charles Haines, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3...William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22.....Duncan C. Stephens, 4 Gateway Center, EXpress 1-1314

San Francisco 4.....William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8.....R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

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that the exception written into the arbitration clause was a vague one and that the court should not deny an order to arbitrate the particular grievance unless the contract "is not susceptible to an interpretation that covers the asserted dispute."

The third case, involving the union and Enterprise Wheel and Car Corp. (Huntington, W. Va.), was a dispute over the construction given a case by an arbitrator. The high court ruled that it was not clear whether the arbitrator's decision was an interpretation of the contract. But it may well have been, the court said, and the courts therefore should not overturn it.

LABOR

OCAW-UMW Brush: Oil, Chemical & Atomic Workers Union has successfully met and conquered the United Mine Workers, District 50, in two locations.

Employees of Hercules Powder Co.'s Bessemer, Ala., plant voted to drop affiliation with UMW and take on OCAW as bargaining agent. Of the 127 votes cast 78 were for OCAW, 49 for UMW (none voted no-union).

And at the Niagara Falls, N.Y., plant of International Minerals & Chemical Corp. the employees, challenged by UMW, voted to stick with OCAW. The vote was 42-38 in favor of OCAW, with one vote void. An election held previously failed to decide the issue when two persons voted for no union, 40 voted for OCAW and 39 voted for UMW. The National Labor Relations Board then scheduled the follow-up election.

•

Rubber Talks: Dates have been set for the start of wage-reopener negotiations between the United Rubber Workers and three of the four major rubber companies. Talks with Firestone Tire & Rubber will begin in Cleveland, July 18; Goodyear Tire & Rubber, July 26; U.S. Rubber in Cincinnati, July 26. No starting date has been set for negotiations with B. F. Goodrich. Under contract provisions time limits have been set under which settlement must be reached. Firestone has an Aug. 2 deadline, while the expiration date for the other firms is Aug. 6. The earlier start for Firestone talks indicates that the union expects Firestone to set the pattern for across-the-board increases.

KEY CHANGES

James B. Fisk to board of directors, American Cyanamid Co. (New York).

S. Louis Gaines to chairman of the board, **Victor Aleck** to president, **Frederick R. Weisman** to vice-president, Biochemical Procedures, Inc. (Los Angeles).

Henry D. Schmidt to board of directors, St. Regis Paper Co. (New York).

Ralph E. James to board of directors, The Polymer Corp. (Reading, Pa.).

Chester G. Gifford to president, **Elmer Rich, Jr.,** to chairman of the board, Simoniz Co. (Chicago).

Michael P. Frawley to president, **Alfred I. Schimpf** to chairman of the board and chief executive officer, **John W. Sugden** to executive vice-president, marketing. B. T. Babbitt, Inc. (New York).

Marshall Lachner to senior vice-president, Revlon, Inc. (New York).

Frank Schottelkorb to president and board of directors, Pitman-Moore Co. of Canada, division of Allied Laboratories, Inc. (Indianapolis).

Herman A. Bruson to vice-president, research, Chemicals Division, Olin Mathieson Chemical Corp. (New York).

Guy T. McBride, Jr., to vice-president, Texas Gulf Sulphur Co. (New York).

Richard J. Gonzalez to board of directors, **Herman P. Pressler, Jr.,** to vice-president and manager, public relations, **Charles F. Jones** to manager, economics and planning department, Humble Oil & Refining Co. (Houston).

Irving Ferman to vice-president, International Latex Corp. (Dover, Del.).

John R. Lill and **Peter Huber** to vice-presidents, J. M. Huber Corp. (Red Bank, N.J.).

John D. McPherson to president and director, Jefferson Chemical Co. (Houston).

Robert L. Mitchell to vice-president-planning, Celanese Chemical Co. (New York).

Tracers

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Hexamethyleneadipamide (6-6 Nylon Salt), Hexamethylene Diamine, Adipic Aid suitable as raw materials of high purity for Textile and Plastics production available for sale. Attractive prices and terms. Quotations and laboratory test samples airmailed on request—S.I.C.I. s.r.l.—Parbigo (Milan), Italy.

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Horiz. T316 SS heat exchanger, 1960 sq. ft., ASME, 1953. Perry Equipment Corp., 1415 N. 6th Street, Philadelphia 22, Pa.

Plant Liquidation—Glass lined tanks, Stainless steel Filter & Slurry feeder—De Laval centrifuge —Stainless cooker, etc. For details, write: Frank Boitz c/o Brewers & Bottlers Equipment Corp., 104 Asylum Street, Hartford, Conn.

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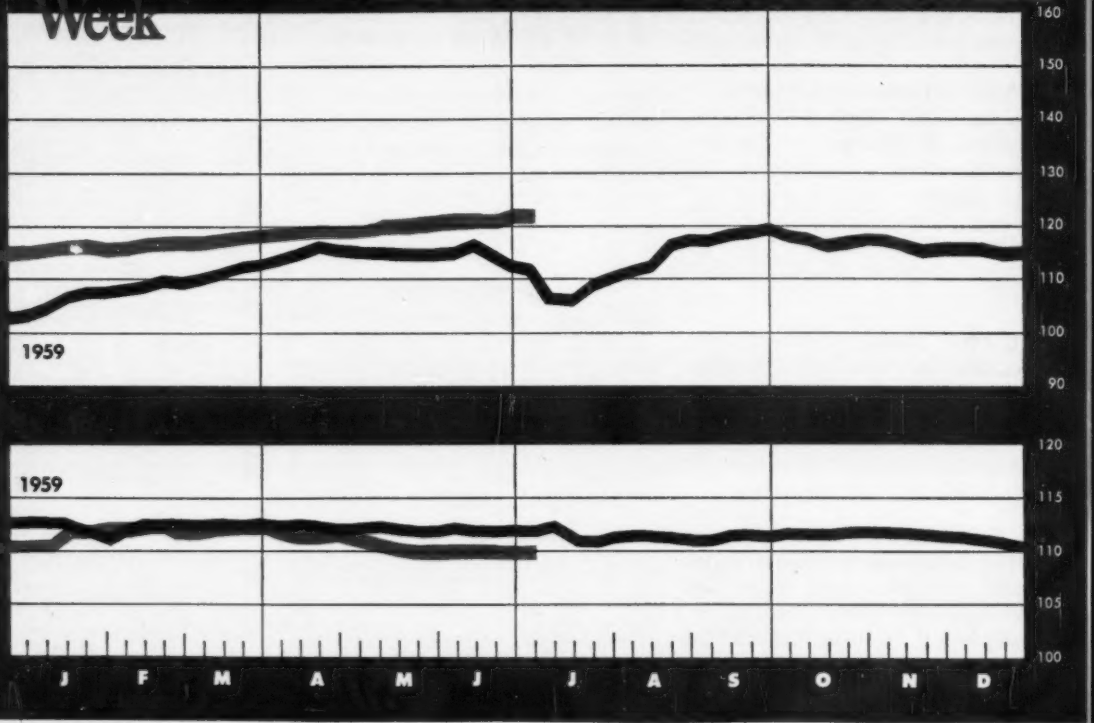
BUSINESS BENCHMARKS



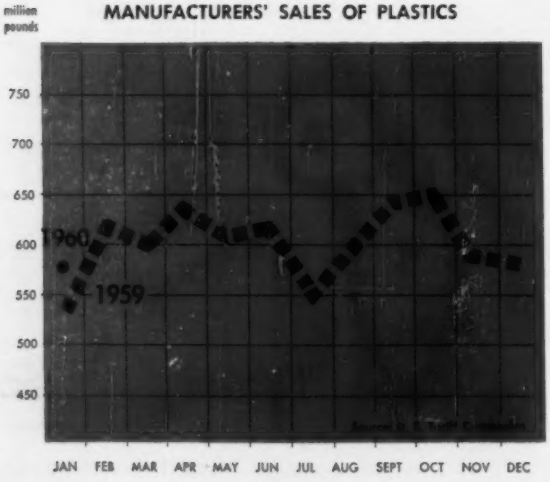
JULY 2, 1960

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1957=100)	122.4	122.2	113.5
Chemical Week wholesale price index (1947=100)	108.2	108.0	112.0
Stock price index (12 firms, Standard & Poor's)	51.69	52.87	57.83
Steel ingot output (thousand tons)	1,739	1,775	2,486
Electric power (million kilowatt-hours)	14,053	13,766	13,331
Crude oil and condensate (daily av., thousand bbls.)	6,840	6,772	7,017

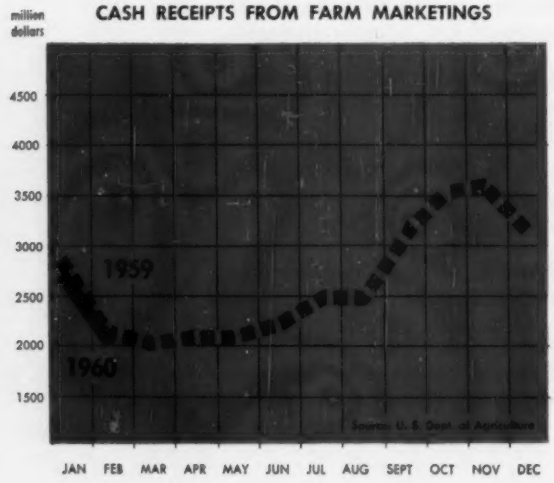
PRODUCTION INDICATORS (1957=100)	*Latest Month*	*Preceding Month*	*Year Ago*
All manufacturing	110	110	109
Nondurable goods manufacturing	113	114	110
Durable goods manufacturing	107	108	109
Chemicals and allied products	125	122	116
Industrial chemicals	129	128	118
Petroleum and coal products	104	103	103

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS



CASH RECEIPTS FROM FARM MARKETINGS



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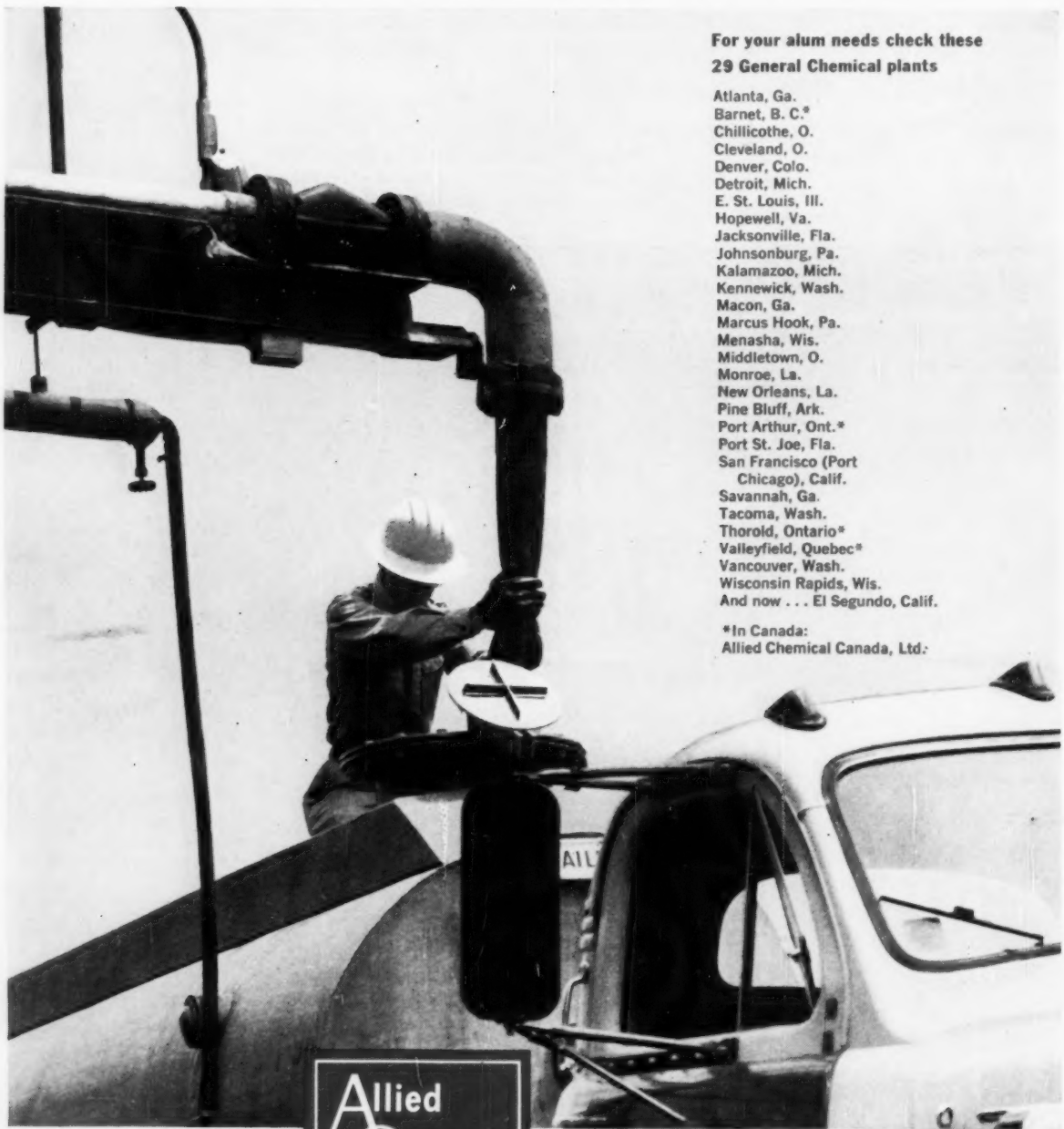

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